COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

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Who is Assaulting Unionism at Marion?

THE law's investigation into the Herrin horror is on. A grand jury of twenty-three Williamson County men—all farmers except a lumber dealer and a part-time miner—has been listening to testimony wrung from scores of witnesses fearful that their revelations will bring about their death by some stroke from the dark. It is a serious and conscientious effort to get at the facts in the case of the slaughter of non-union men who surrendered to a mob which had attacked the strip mine they were trying to work. It is an investigation by officers of constituted authority. It is an action by a court of the American people. Yet already this due process of law is being obstructed by devious tactics. Already the action has been labelled "persecution of labor" in a well-developed campaign of propaganda. Dominated by the moneyed interests, the courts, we are told, are trying in this case to crush organized labor. Such was the labor defense in the Mooney case. It has become well worn by usage.

But if an assault is now being made on unionism at Marion, who is making it? Who is it that stirs up public sentiment against the prosecution of the case to such a point that the prosecutors are threatened horribly—not once but hundreds of times and by many devices? Who is it that frightens witnesses to the point of silence? Who is it that openly condemns the jury action as tainted by money? Who is it that agitates for a general strike of Illinois miners as a protest against further action in the case? Who is it that suddenly begins a vicious campaign of stopping shipment of coal from the mines of Williamson County as a form of protest against the investigation? Whoever performs these acts is taking a definite stand against law and government. If it is proved that the United Mine Workers of America sanctioned and condoned such acts then the "assault upon unionism" is an assault by the United Mine Workers of America and by nobody else.

Huntington Greets Electrical Engineers

COAL mining, as we now view it, is the art of extracting coal from the ground by electrical apparatus. The engineers of West Virginia and Kentucky some few years ago felt the need of an association that would deal in the main with the mechanical and electrical problems that new methods of operation were making of vital importance to the coal industry. They felt that the old institutions—the coal-mining institutes—laid most of their stress on management, social questions, legislation, geology, air circulation, drainage, roof support and like subjects with which mechanical engineers had little or nothing to do. They wanted an institute that would limit its study to the mechanical problems of mining and would give those attending its meetings that mental pabulum which would be of value to them in their daily careers.

Electrical and mechanical engineering at the mines has a distinct industrial flavor. In some ways the mine electrician has problems in common with those of the electric-railway engineer. He has the same interest in wheels and axles, brakes and brake shoes, trolley-wire suspensions, draw-bar pull, starting problems and portable resistances. Still his problems are different. His shop facilities, to begin with, are less. His locomotives are subjected to greater violence, his tracks are lighter, his wheel gages are narrower, he must suspend his wires from the roof of the mine, from timbers or from supports drilled in the coal. He could not feel at home for this and many other reasons in societies like the American Electric Railway Association, and indeed that organization might not be pleased if he intruded his peculiar needs into the discussion of problems so widely different, though analogous.

The electrical engineer at the mines has his central stations, but his troubles are with plants far smaller than those which are maintained by most public utilities. His loads are different; his coal is obtained at a different price and is or should be in many cases inferior, for he is often striving to consume the unsalable; he is not selling power; he may be buying it. An endless line of items would be needed to show the differentiation between the public-utility electrician and his brother at the mine.

For these and similar reasons he would not be welcomed at meetings of the National Electric Light Association, for again he would introduce conditions alien to those under which public-utility engineers are operating, and the papers he would present and the discussion he would offer would be likely to lead the meeting from its special subject, which is how to generate electrical energy for the public and how to sell it when generated.

There is no industry perhaps with the meetings of which mine electrical engineers could associate themselves with advantage. They want every paper to be helpful to themselves, and the other industries have similar desires. Some use storage-battery trucks but not trolley locomotives and some use the latter and not the former. Most have a more even load and few problems in common.

The superintendent of the power and mechanical department of a mine has a machine shop to manage. He has the duties, therefore, of a machinist; but here also his problems are special. He has few repetitive jobs. His work is mainly that of repair. He cannot attempt to arrange his work after the model of a Ford, a Lincoln or a Willys. But though his jobs are smaller they can be as much bettered by judgment as can those of an automobile factory. The right tools to buy, the way to do the best with what is on hand, what extensions should be made, can best be learned from those who have the same problems to confront.

Furthermore, the American Institute of Electrical Engineers, which would seem an appropriate place for electrical mining men, gives more time to questions of

design, to the mathematical problems of electricity, to tests of dielectrics and like subjects than to problems such as the electrical man at the mine must understand.

Looking around the mine, electrical engineers decided that they would do well to foregather with themselves. Hence the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers. Its meetings have done much to advance the practice of mechanical and electrical engineering in West Virginia, Kentucky and Virginia and a large future seems assured as electric energy continues to be used for more purposes and with increased complication.

Price Control—by Indirection

AFTER some hesitation and considerable debate the Senate passed the Cummins coal-control bill last week. In principle this is the same as the Winslow bill passed in the House. When these bills are harmonized in conference the country will have legislation giving price control of coal—by indirection. It does not appear that there was more than a modicum of hesitation on the part of Congress to give the administration price control; hesitation was entirely on the point of how to do it without overstraining the Constitution. Many there are who hold that Congress has not yet, in either the Winslow or the Cummins bill, found a way to fix maximum prices on coal that is not in violation of the Constitution, but the bills have been passed notwithstanding.

The attitude of the administration on the subject of price regulation and control of distribution was voiced by Secretary Hoover on Aug. 28 in a statement to the House Committee on Interstate and Foreign Commerce. He said: "It does seem to me that there is a public necessity for action; that there should be some restraint on the extortionate prices. It is obvious that regardless of the resumption of mining there will be an alteration of the situation from that of a short production to that of a short transportation—that we have a continuous condition of effective famine in coal. In the face of shortage in supply the coal will go to the highest bidder, and price alone is not from a social point of view a proper basis of distribution. That means the poorer classes must bear the burden of deprivation. If distribution is to be based solely upon the highest bidder, it means suffering for a large portion of our population, and it does not in this situation mean an addition to production. The usual defense of unlimited price during shortage is that it stimulates production. Our limit of coal at fair prices is a limitation on transportation, not of mining."

Mr. Hoover said that two ways of accomplishing price control had been considered. One was "to use various federal authorities as a foundation for the government taking possession of coal at a fair price." This, he explained, would put the government in the coal business, and therein lay its chief difficulty. The organization to handle it would take too long to bring together. The trouble would be over before the machine would be working.

The plan adopted by Mr. Hoover and his conferees on the Presidential Coal Committee contemplates an extension of the powers of the Interstate Commerce Commission to enable that body, on the advice of the Federal Fuel Distributor (whose duties, we are told, "practically amount to the determination of facts and the establishment of co-operation"), to permit the use of coal cars only by those shippers in interstate commerce complying with established orders as to distribution and price.

It is far from clear on what constitutional grounds this power is to be granted. Washington, official and unofficial, has been debating the question for weeks. The chief counsel for the Interstate Commerce Commission, Mr. Farrell, appears to base his belief as to its legality on the theory that "if by reason of that exorbitant charge, interstate commerce is made impossible, then they go to the root of the evil and apply it to the thing over which Congress has control." That is to say, he looks to the commerce clause of the Constitution to sustain this legislation. Further on he says: "It depends upon whether it is a burden upon interstate commerce. Congress, in the first instance, has the right to exercise its judgment in determining the facts."

Whether it can be done legally or not, beyond doubt it is to be done, or tried at least. There are abundant reasons why it should be tried, reasons that lie mainly in the domain of distribution, however.

The supply of anthracite will be woefully inadequate and can be made to serve only by careful distribution all the way down the line. The government at Washington can direct the flow of this coal only between states; beyond that, at the actual point of retail distribution the good sense of the retail dealer, supported by local opinion and in some instances by state legislation, is our only hope. We feel that the trade will respond manfully.

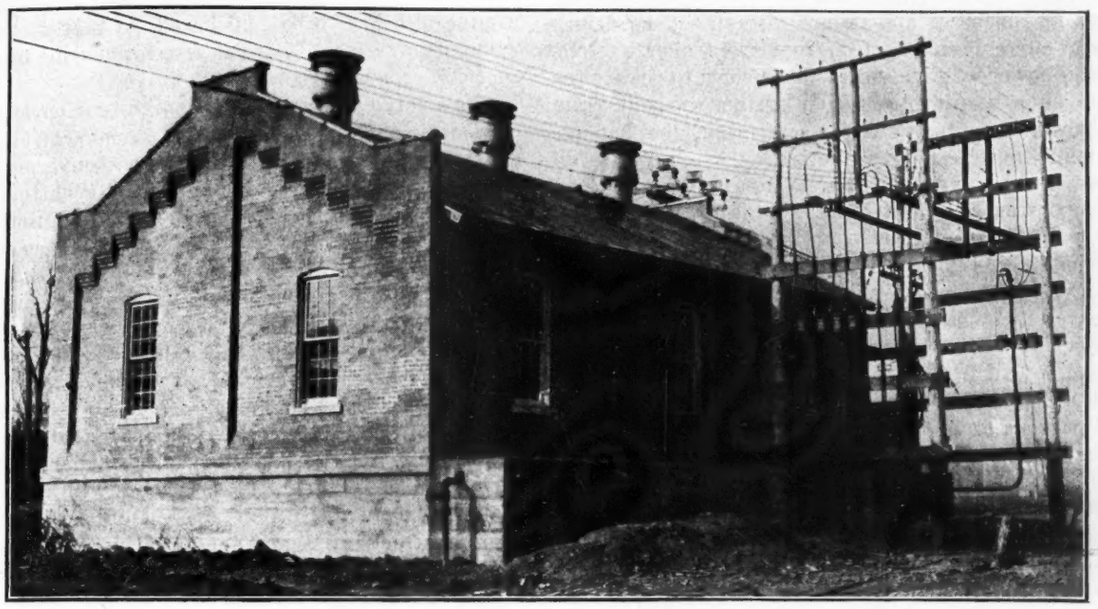
As for bituminous coal, the immediate prospect is for a current output this winter averaging little above actual requirements, leaving such large budgets as normal storage for the Northwest and for railroads and industrial plants over the country in precarious state. Just now prices on soft coal are declining. They will continue on the downgrade only so long as buyers are willing to hold off. The recession is temporary, and prices, unless arbitrarily checked, will soon start another ascent. The pending legislation is designed to perform this checking.

Thus the coal industry faces in times of peace the kind of regulation it has been fearing and opposing since 1919. External causes have brought it about and it appears that external agencies must be depended upon to remove, at some later date, its incubus on the trade.

THERE IS LITTLE COMFORT in the Herrin case for those violent anti-aliens who froth lavishly at the mouth when any crime is committed by a man named Pellini, or Mallakoff, or Papafrangos or Pshmlzinczheick or anything like that. The names of a large number of coal miners in Williamson County indicate that they sprang from the racial stocks of the four corners of the world, but there also are a large number in that county whose forbears trailed long rifles through the Blue Ridge Mountains and other purely American "God's countries." It would appear, from a casual glance at the long list of Hancocks, Coopers, Baxters, Kirbys and Craigs indicted by the grand jury that aliens are socially ineligible for some of "bloody" Williamson County's grisly enterprises.

A MAN IS KNOWN by the company he keeps, but a company is known by the men it keeps.—*Indianapolis News.*

RAILROAD LABOR IS FINDING OUT that its goal is not within striking distance—*Washington Post.*



Economical Ways of Transmitting Power Underground*

Importance of Keeping Trolley System Separate from Power Circuit—Alternating-Current Power Cheaper Than Direct—Protection Against Electric Fires—Outside Stationary Motors Should All Be Built for Alternating Current

SEEING that the problem of distributing electric power in mines is so closely connected with the source of power and the outside feeders of that power, a brief description of these will be given before dealing with the subject of underground transmission and distribution.

The main points to be considered are the voltage of the circuit used, the kind of current used, and the method of bonding the mine tracks.

The U. S. Bureau of Mines divides the voltage of circuits and equipment into three classes, as follows: Class 1—"Low." Not over 300 volts direct current or 240 volts alternating current. Class 2—"Medium." Between 300 volts and 600 volts direct current, or 240, and not over 480 volts, alternating current. Class 3—"High." Six-hundred volts direct current or 480 volts alternating current and higher.

It might be well to summarize a few of the rules that two of the states have adopted regarding electrically operated mines. The State of Alabama has the following rules: No apparatus or conductors carrying a voltage within Class 3 shall be allowed in or about working places. Portable apparatus using voltage of Class 3 is prohibited. Electrical equipment installed after this date (date not available) shall not use any voltage higher than that in Class 1 in or about working places. This does not prohibit the use of voltage defined in Classes 2 and 3 (except in or about working places) provided such apparatus is installed and maintained according to these regulations.

Three-wire double voltage systems having a maximum voltage within Class 2 may be used if the neutral is effectively grounded and if the maximum voltage between any conductor and the earth complies with these requirements.

We might also mention the following rules adopted by the State of Pennsylvania: All electrical apparatus or conductors shall be of sufficient size and power for the work they may be called upon to do, shall be efficiently covered or safeguarded as the law thereafter prescribes, shall be so installed, worked and maintained as to reduce to a minimum all danger from accidental shock or fire and shall be of such construction, and so worked, that the rise in temperature caused by ordinary working will not injure the insulating material.

The Pennsylvania (bituminous) law also has the following provision: At every mine where electricity is used below ground for power, a competent mine electrician shall be employed who shall have full charge of the electrical apparatus in the mine, but shall be subject to the authority of the mine foreman.

We will now consider what the electrical installation of an electrically operated mine should be. A success-

*First part of report of committee on underground transmission and distribution to be presented at the session of the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, Sept. 20, at the session in Huntington, W. Va. The committee consists of C. J. Fuetter (chairman), M. H. Powell and H. E. Carlton. The second part, which will appear next week, gives a detailed description of the workings of an automatic substation at Van Lear, Ky.

NOTE—Frontispiece shows surface station of the Pittsburgh Coal Co., at Montour No. 10 Mine, Broughton, near Library, Pa.

ful mine haulage requires direct current for the motors of locomotives. Hence, as there must be a trolley wire and possibly some feeder wire, it is only natural that the cutting machines and pumps also should be driven by direct-current motors fed from the trolley system. Recently, however, mine owners have come to realize the importance of keeping the trolley system separate from other power circuits, so that accident on the haulage roads which may tear down the trolley wire will not interfere with the supply of power to the cutting machines, pumps, booster fans and other apparatus.

The potential supplied to trolley and feeder wires should not exceed 250 volts direct current. If the mine is of any size and the direct current is generated outside, excessively large feeder wires must be installed if a sufficient voltage is to be maintained at the working places.

With a 250-volt system electric current can be transmitted without excessive loss in voltage only for limited distances. As the current is inversely proportional to the voltage of a given connected load and the losses are proportional to the square of the current it is easy to show marked savings by the use of higher transmission voltage. These savings show up in the amount of copper required in the circuit, the output of the machines and the cost for the maintenance of the motors. Reduced voltage causes motors to operate at low efficiency and at underload and underspeed, the current used also is increased, and as the heating is proportional to the square of the current, motors soon overheat and burn out, causing delays and high repair charges. With reduced voltage at a cutting machine the lineal feet of coal cut per shift falls off. With reduced voltage the haulage locomotive hauls fewer cars per trip and makes fewer trips per shift, and eventually its motors burn out.

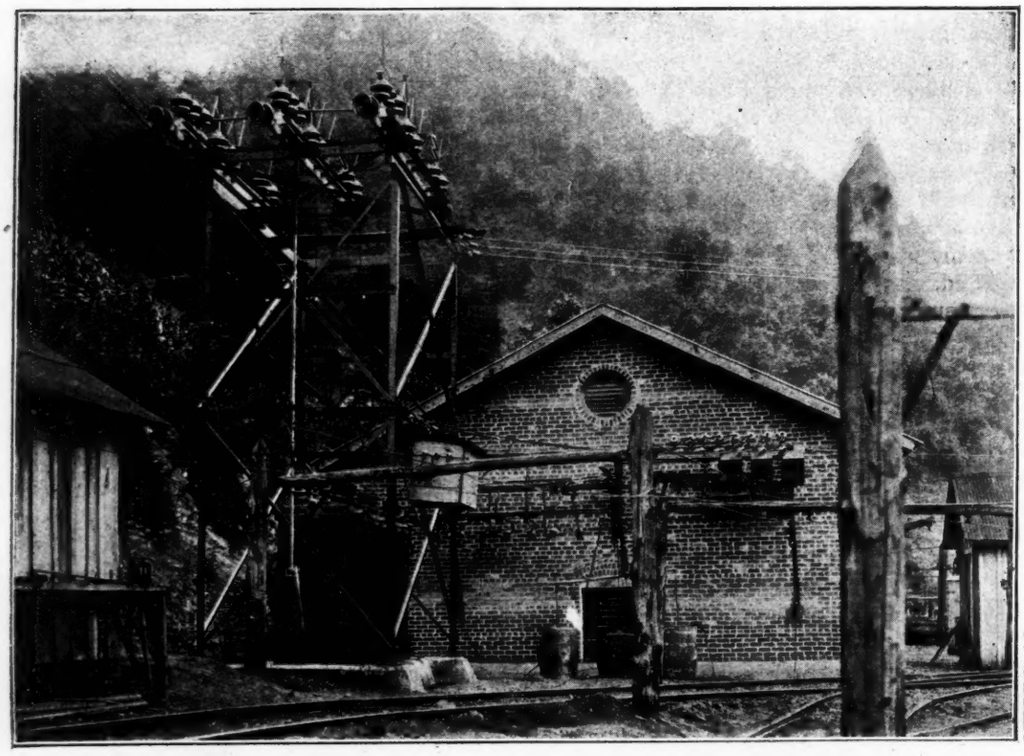
No set rule can be given for determining the economical limit of distance for a 250-volt system, because it will vary with the nature of the connected load. Some mines cut and haul coal on the same shift, and in this case the transmission problem is quite different from that in a mine that cuts on one shift and hauls on another. Then again the nature and development of a mine also has to be considered, so that the economic value of any given electrical system must be figured out for each separate mine.

For a large mine the use of high-tension alternating current probably will be most economical, in that a substation equipped with a rotary converter can be installed near the load center, the alternating current being dropped through a borehole into the mine at 2,100 to 6,600 volts. For this purpose a three-conductor lead-covered and armored cable is used, insulated for twice its working voltage. It is for such an installation that a rotary converter has been recommended because with most mine loads the peak determines the capacity of the machine. A synchronous converter will carry about twice as much momentary overload as a synchronous motor generator. Consequently with such a converter it is possible to use a smaller unit, which even with the necessary transformers will not cost more than the equivalent motor-generator set. Where no regular attendant is at hand to adjust the rotary converter for load variation it can be set so as to give a higher average power factor than a motor-generator set.

The room in which an underground substation is housed should be of fireproof construction, well ventilated with fresh air and wired in accordance with the requirements of the National Board of Underwriters. Transformers should be so arranged that if one should explode the oil would not flow outside the room.

The high-tension supply lines should be equipped with lightning arresters of approved type, with proper ground connections. Arresters should be located on the surface at a point near where the cable enters the borehole. A fused horn-gap disconnecting switch should be provided for each phase.

As the substation usually is located at a point near the load center, the 250-volt direct current is sent from

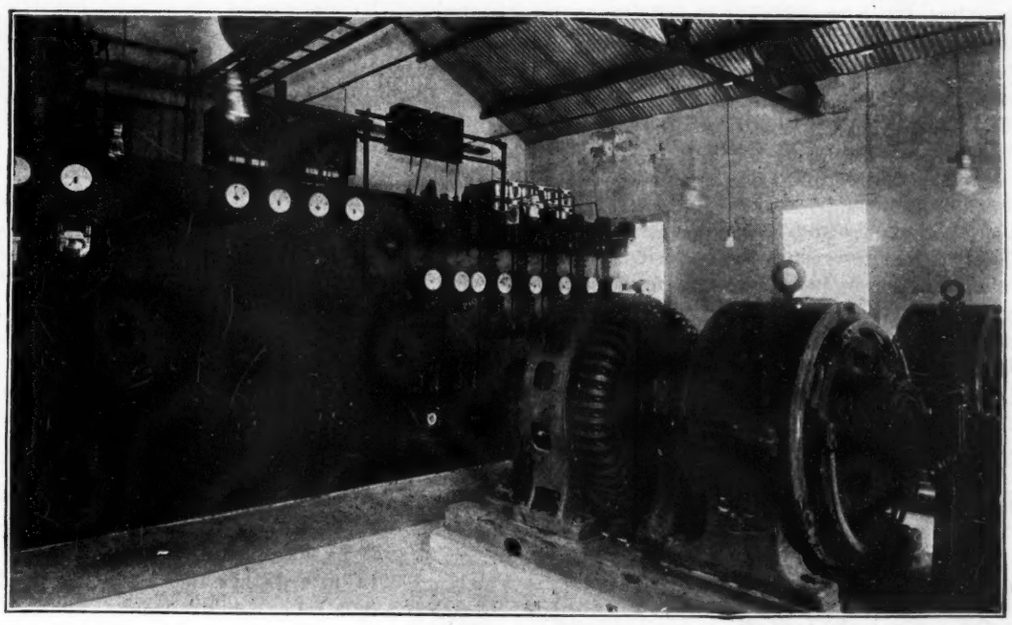


Main Substation, Toms Creek, Va.

This substation, belonging to the Virginia Iron, Coal & Coke Co., operates 24 hours per day and is the key station at the Toms Creek plant. In its work it is aided by two substations, one three miles away in one direction and one a mile distant in the other. These work only 8 hours per day. Each station is connected with the other two for parallel operation. In each station are two 200-kw. 600-volt direct-current generators driven directly by 2,300-volt 60-cycle synchronous motors which are hand-started with full automatic feeder panels.

Interior of Main Substation

This illustration shows the front of the switchboard, the two generators and two of the synchronous motors. By the use of this substation and two others the power is so distributed that the drop in voltage at no point exceeds 10 per cent. In consequence there is no low voltage anywhere along the line, though there are ten mines scattered along an S-line frontage of four miles.



this station to the different parts of the mine through feeder and trolley wires, either in one or several different circuits, according to the layout of the mine. In planning the installation of these wires care should be taken to install wires of the proper size to carry the maximum amount of current which may be needed. In doing this consideration should be given to the future load to be transmitted. In any event no smaller trolley wire than 1/0 B. & S. gage should be used, but, regardless of the size, it should be securely supported on approved hangers placed at such intervals that the sag between the points of support will not exceed 3 in., unless, indeed, the height of the trolley wires is 5 ft. or more above the rail and the wire is so supported that it will not touch the roof when the trolley runs on it.

The height of the wire above the top of the rail should be made as uniform as practicable and the wire should be placed at least 6 in. outside the rail and on the opposite side from the traveling way and shelter holes. On straight runs hangers should be spaced between 20 and 30 ft. apart, according to the height of the roof. On curved runs enough hangers should be placed to keep wire from swinging unduly in either direction should any one of them fall out. At about every 2,000 ft. a quick-break single-pole switch or a section-insulator cutout of the correct carrying capacity should be installed, so that, when desired, the wire can be entirely disconnected from the power supply.

All joints in trolley wire should be made electrically and mechanically efficient. This usually is done with the aid of what is called trolley-wire splicers. Means should be provided for cutting off the current in circuits branching off the main trolley wire. At some of the mines of the Consolidation Coal Co. a scheme to prevent mine fires has been put in successful use. Throughout the mines where this scheme has been adopted many pumps are located which it is necessary sometimes to keep going day and night.

In this case besides the Ohio Brass type M section insulator switch, which is installed on all branch circuits, a bypass is provided through a quick-break single-pole switch and also a fuse of the proper capacity to take care of the night load on this circuit. When the motormen make their last trip at the end of the shift they throw the regular branch cutout. This takes the power off the circuit. When the night pumper comes in, in order to get power for his pumps he throws in the bypass switch, making all the power delivered to the pumps go through the fuse. If a fall occurs during the night and the trolley wire comes in contact with the rail or any other material that will cause a ground, the fuse is blown out and before a fire can start the power is cut off.

In most mines both the feeder and the trolley wires must be placed along the roadways. These passages are necessarily low and in many places poorly lighted, if at all. Consequently these circuits must be protected at all points where men must pass under them while at their work or when traveling to or from it. It seems that the best method of safeguarding these places is to have boards on each side of the trolley wire, these boards being supported by iron hooks wedged in the roof. For feeder wires only one board may be needed.

The method of hanging feeder wires along haulageways demands careful consideration. Feeders should be so located that they will be as free as possible from mechanical injury, such as a fall of rock or coal or a derailed mine car might occasion. All trolley or feeder wires coming in or leaving the mine should be provided with lightning arresters, located near the mine opening.

The trolley and feeder wires installed in a mine should be large enough to carry the maximum current not only without danger of overheating but also without a drop in voltage exceeding 15 per cent at any point under load on the system. For this result not only should plenty of copper be hung overhead but a good return should be provided. The rails usually are employed as a return.

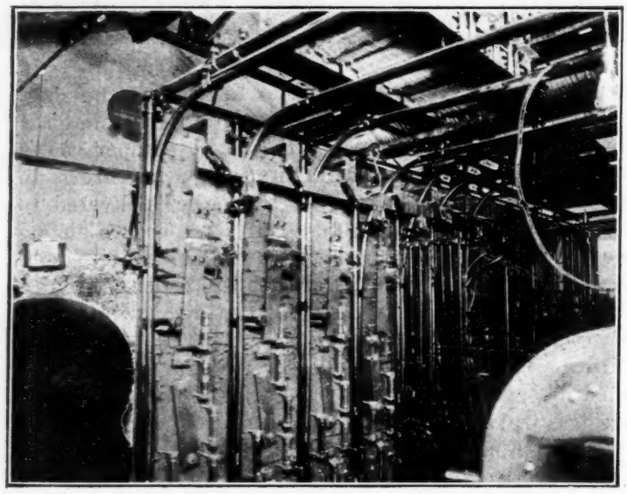
This part of the circuit is just as important and has just as much bearing on the proper operation of the equipment as has the positive wire. For this reason the track rails should be fishplated and be provided with bolts drawn up tight enough to reduce the vibration of the rail as much as possible. Every joint should be bonded and the two rails cross-bonded every 200 ft. Provision also must be made for bonding around all

switches, frogs or openings in the track, so as to insure a continuous return, no bond of less than a 2/0 wire being used, and where necessary 4/0 should be provided.

On main-haulage roads it is good practice to bond both rails. After the bonding is installed it should be carefully maintained and given care equal to that afforded positive wires. If not properly maintained the voltage drop may become excessive. There is danger also that shocks may be received from a poor return.

In the last few years the electrically welded bond has been used extensively in mine work, and no doubt it will be adopted eventually at every mine where greater efficiency at low cost is sought. At one mine two men did all the bonding, using compressed terminal bonds. The placing of ten bonds was considered a good day's work, the men being required to drill the necessary holes in the rails.

After a little teaching these men learned to install electric-welded bonds, and after a short time they did not feel satisfied unless they had installed on old track



BACK OF THE SWITCHBOARD AT MAIN SUBSTATION
Showing also part of one of the synchronous motors on the left and the resistance grids above the switchboard.

at least forty such bonds in a shift and as many as sixty where the track was new. Two years ago about 400 such bonds were installed in a certain mine, and up to the present day not over six of these bonds have been reported as loose. Every one of the defective bonds happened to be among the first installed. At the time they were made the men had not had the required experience to do good electric welding. The men in charge of this work are convinced that the electric welded bond is far superior to any mechanical bond so far used: first, because a better electrical and mechanical joint is obtained, and, second, because the cost of installation is lower.

In recent years many engineers have advocated running all machinery, except the haulage locomotives, with alternating current. As a result fans, pumps, coal loaders and mining machines are now available driven by alternating-current motors, but before adopting this current for mining machines particular attention should be paid to the type of machine selected and the conditions under which it is to operate.

The squirrel-cage induction motor generally used for mining machines has practically constant-speed characteristics, and the speed cannot be satisfactorily varied by the use of resistance, but the three-phase squirrel-cage induction motor is more rugged and freer from trouble than the direct-current motor. As it has no commutator or brushes, repairs to windings are made much more easily. This type of motor when overloaded or subjected to a reduced voltage will practically quit, so it is not likely to burn out like a direct-current motor.

The starting torque or ability to accelerate a load from a standstill is more definitely fixed or limited in the squirrel-cage induction motor than in the compound-wound direct-current motor, and as a result the mine wire must be well installed and normal voltage maintained under full load if an alternating-current installation is to be operated satisfactorily. This feature of the induction motor of not operating when the voltage has dropped is really more of an advantage than a fault as it demands better voltage regulation, which in turn means efficiency and increased production at lower cost.

Should direct-current motors refuse to work when proper voltage is not maintained many mines in the long run would make a much better showing. They would produce coal more cheaply and keep the cost per ton more uniform year in and year out.

Should Alternating-Current Cutters Be Used?

Everything considered it is a question whether in the larger mines the alternating-current motor-driven mining machine should be used where the mine has not been developed to a point making electric haulage necessary. Provided alternating-current power can be purchased, it might be good policy to use it, installing transformers above ground and supplying power to three-phase induction motors on the mining machines through a three-phase cable properly installed in the airway or lowered through a borehole. Such an arrangement might give good results at a minimum cost of equipment.

Whether alternating-current motors should be used to drive pumps inside a mine depends on many conditions, but where they are favorable and alternating-current power is obtainable there should be no hesitation about the matter. It is sometimes an easy matter to lower a 2,200-volt three-phase cable through a borehole located centrally over a number of the larger pumps.

In this case the transformers could be located at the bottom of the borehole, in a room of fireproof construction, the 2,200-volt current before entering the transformers being passed through fuses of the proper capacity, and from the fuses into a three-phase oil-break switch equipped with an automatic overload trip having a trip coil in at least two phases. From this oil switch the wires could then be brought to the three transformers.

The circuit leaving the transformers need not be provided with either switch or fuses if these are installed at the places where power is used. It is hardly necessary to mention that the transformer room, besides being of fireproof construction, should also be well ventilated and well lighted and that all wiring should be done according to the requirements of the National Board of Underwriters. The secondary of the transformers should be either of 220 or 440 volts. The motors driving pumps should be of the squirrel-cage type and motors above 5-hp. should be equipped with either a manual or an automatic starting compen-

sator, either type to have no-voltage and overload release coils.

The cost of power also is an item to be considered when figuring on such an installation. The following figures give the costs of alternating-current and direct-current power per kilowatt-hour. They are taken from four large mining properties operating their own central power plant and are for the year 1921, when coal prices and wages were at their highest. We will call the different plants Nos. 1, 2, 3 and 4.

No. 1 plant generated alternating current at a cost per kilowatt-hour of 0.66c., the direct current at the mine cost 1.13c. for the same unit. At No. 2 plant alternating current cost 0.75c. and direct current 1.57c. per kilowatt-hour. At No. 3 plant alternating current cost 1.10c. and direct current 2.54c. per kilowatt-hour. At No. 4 plant alternating current cost 1.44c. and direct current 2.86c. per kilowatt-hour.

From these figures it will be seen that the difference in cost of power alone is an item on the side of economy large enough to favor the installation of alternating-current motors on pumps wherever possible, but, as mentioned before, the final saving in the power bill depends on many other conditions besides the cost of the current used. The lower maintenance cost will justify the extra investment involved in providing an alternating-current installation. In gaseous mines, of course, preference should be given to alternating-current equipment regardless of first cost, for an alternating-current motor has no commutator and brushes to form arcs and so explode any gas that may be present. For these reasons whether to use alternating- or direct-current motors to drive pumps is a problem to be solved individually at each mine.

Details of Toms Creek Electric Installation

The following is a description of the underground transmission system installed in the Toms Creek, Va., Mines of the Virginia Iron, Coal & Coke Co. H. E. Carlton is electrical engineer for this corporation and credit must be given him for this information. Should the potential be 250 volts direct current in place of 600 volts, and other conditions remain the same, the installation would be a model in every way, but this committee could not recommend the installation of any direct current having a potential exceeding 250 volts.

The Virginia company has ten openings at the plant mentioned. These are scattered over a distance of approximately four miles and are disposed almost in the shape of the letter "S" with the curves flattened out. A substation is located at each end of the long line of openings and a third has been built three miles from one end and one mile from the other. The machines are 200-kw. 600-volt direct-current generators driven by 2,300-volt 60-cycle synchronous motors. They are all hand-started with full-automatic feeder panels. Two machines connected for parallel operation are installed in each station and each station is connected with the other two for parallel operation. The center station, although the last installed, is the key or main station and operates 24 hours per day.

The other two are operated for 8 hours only, one machine being normally used in each station. This leaves two machines in reserve at all times, so that any one station may be out at any time and not interfere with the operation of the mines.

The outside feeder capacity is so distributed that at full loads no more than 10-per cent line drop is allowed. The result is that the voltage is practically constant at every point of delivery.

No. 1 mine is on the retreat so that the problem of filling future requirements is past. The mine is fed by 2/0 figure-eight trolley wire suspended on pipe driven into boreholes in the side of the coal so as to give the wire a uniform height of 6½ ft. above the rail and 18 in. to the right of the track. All crossings where the standard height cannot be maintained are guarded with ¾x6-in. boards fastened to the roof.

Bond Just Long Enough to Clear Splice Bars

The return is secured by bonding one side of the 40-lb. steel with 2/0 pin-driven all-wire bonds 26 in. long, which is just long enough to clear the splice bars. When installed in this manner a wrecked car rarely will cut out a bond. These bonds are installed on the inside of the rail.

The load consists of one 20-ton bar-frame locomotive, one 20-hp. pump motor, and one 25-hp. fan motor. The coal in this mine is gathered by mules, and the loaded cars have to be drawn up heavy gradients.

Number 2 mine is fed by approximately 6,000 ft. of 4/0 figure-eight trolley wire with 2,000 ft. of 300,000 circ.mil cable feeder in addition. The current returns by 40-lb. steel with 4/0 pin-driven all-wire bonds up to 4,000 ft. where the return feeder from No. 2 station comes in, the rest of the road being bonded with 2/0 bonds of the same type. The trolley wire is supported by pipe hangers in the side of the coal rib and by roof hangers fastened in the roof with the aid of expansion bolts.

When the roof is of sandstone a timber hanger is used. This is installed by drilling two ¾-in. holes 4 in. deep, a poplar wood peg being driven into the holes thus formed. Two 20-lb. track spikes driven into the wood complete the job. This method gives a secure support of low cost, and it stays in place longer than any other type of roof construction I have ever used.

The load in this mine consists of two 15-ton trams, four 4-ton gathering motors and mine-pump motors aggregating approximately 100 hp. Two storage-battery locomotives also are used in this mine.

No. 3 is the largest of the mines and has the most coal for future development. It is being worked on the three-entry system with the left and center main both tracked to the heading. The east and west headings are driven on the face with cross entries to the right and left. The main feeders are two 4/0 figure-eight trolley wires for approximately 14,000 ft. with a 300,000-circ.mil cable extending about 8,000 ft. into the mine. The current returns by a single track bonded on both sides with pin-driven 4/0 all-wire bonds installed on the inside of the rails.

This track is of 56-lb. steel. The other main is laid with 68-lb. steel and is bonded with the same size of bond. Both tracks are cross-bonded every third rail and the two tracks are connected every 300 ft. with a 300,000-circ.mil cable.

The trolley wire is supported by mine-timber hangers installed with expansion screws part of the way and spikes and plugs the rest of the way. To date the spikes have given the best service, but as the oldest of them have been in place only six years, the lasting qualities of this method of construction have not yet been completely tested. As the hangers put up with spikes and plugs have been up six years and so far have not given any trouble the chairman of this committee

hopes that Mr. Carlton will live long enough to give them a thorough test.

The feeder is installed one foot from the trolley on porcelain feeder insulators with U-straps and bolts into the top or, like the trolley wire where the roof has fallen, by pipe supports from the coal. Both trolleys and feeders have cut-out switches every 2,000 ft. after the first mile. These switches are of 1,000-amp. capacity with quick-break contacts.

The wiring in the cross-entry is strung in the same way as in the main with the exception that only one cut-out switch is used—that is, where the trolley leaves the main. These switches are installed on the first straight wire after the turnout. On the east and west entries 4/0 trolley wire is used and on the cross-entries the trolley wire is of 2/0 cross-section.

The track on the east and west mains has both rails bonded with 2/0 pin-driven all-wire bonds, whereas the cross-entries have only one rail bonded. As the rooms are turned from only one side of the cross-entries the straight or through rail is always selected for bonding.

On all switches the frogs are bonded around with cross-bonds, so that the lead rails are bonded on but one side. The bonding of only one rail requires much more attention, but if properly maintained will give excellent results on 600-volt circuits.

The load in this mine consists of two 20-ton bar-steel locomotives, one 13-ton tram and seven cutting machines, motors aggregating about 200 hp. being installed on pumps and booster fans. The coal is gathered with six 4-ton locomotives and some mules. These latter are gradually being displaced by locomotives.

The wiring in the other seven openings at this point is of the same general type with the loads running in about the same ratio. For the past year a ton of coal has been dumped into the railroad car for every 3.15 kw.-hr. of power purchased. This includes pumping and all dead work. For a year of poor tonnage, as the past year has been, this is rather a good average.

The bonding in two of the other plants differs somewhat from that outlined for the above mines. One plant has all main-line and cross-main tracks bonded with 4/0 and 2/0 pin-driven all-wire bonds with the terminals outside the splice bar but with the body of the bond bolted one strand under and one strand over the splice-bar bolts. These bonds have been giving excellent service. The track, it is true, is in good condition and is so maintained. These bonds have been in place over a year, yet so far none has been found loose. In fact switchboard voltage is obtained at the face all the time.

The other exception is a plant having four openings. This has all track bonded with pressed-terminal concealed bonds. The trolley wire and track in this mine are better maintained than any I have ever found underground and the following statement will be proof that this is true: With one 10-ton tram, seven gathering locomotives, five cutting machines (representing three makes) and 150 hp. in stationary motors underground not a single armature has failed since February, 1922. For 600-volt operation I believe this an excellent sign that the feeders and bonds in these mines are in good shape.

Wherever we install purchased power we replace all outside direct-current motors with alternating-current synchronous wound-rotor and squirrel-cage induction motors. This I think will be done all over the field in the next few years if business conditions will permit.

Who Shall Estimate Slate Yardage and How Should the Work Be Done?

By J. A. Graft
Beckley, W. Va.

At a meeting of coal men from mine foremen up with engineers in attendance apparently 80 per cent of those present said that the mine foreman should measure slate yardage. It was alleged that if the engineer did it dissatisfaction would be sure to arise.

In this connection may be exhibited a form used by the engineering department of the Raleigh Coal & Coke Co. which has been used most successfully, and it seems so simple that it should not be difficult for a mine foreman to use it, the engineer filling in that part of it relating to the distances. This would prevent the mine foreman from crediting the entrymen with having shot down more slate or driven more heading (where payment is made on that basis) than can be found in the engineer's note-book and map.

In some cases finding the company more lenient toward charges for slate yardage which are not matters of opinion than for dead work (which is not so clearly specified in the understanding between employer and employed and which is not as easily assessed) the mine boss will turn in dead work as yardage. Nothing will be said here of actions not having even this degree of justification except that they have been known to occur. I may say also that a method closely resembling this has been used by the Pennsylvania Coal & Coke Co. with offices at Cresson, Pa., using a cross surrounded by a circle as a station and an acute-angled L to designate a corner.

Location Consolidated Engineering & Construction Co Beckley, W. Va.

Date	No.	TOP +	TOP Yds.	TOP Inch	TOP Price per Yd.	Check No.	BOTTOM +	BOTTOM Yds.	BOTTOM Inch	BOTTOM Price per Yd.	REMARKS
7/15/22	320	+18	6	12"	$1.20	320	+12	4	8	$1.80	
8/1/22	"	+36	6	10"		"	+24				
8/12/22	"	+56				"	+36				
8/1/22	328	+5				325	+2				

More Details as to Jerry Dunn's Output

Desire having been expressed to obtain more information regarding the output of Jerry Dunn described in *Coal Age*, Aug. 10, p. 216, the following further details will doubtless be of interest: The rate paid was 63c. per car, making a straight earning of $295.47. In addition he received a bonus of 8c. per car, or $37.52, a prize as leading coal loader at No. 3 mine of $10, and a further prize as crack loader in the contest between Loma No. 3 and Cora No. 2 of $20—a grand total of $362.99 for thirteen days' work, or $25.61 per day for straight earning and bonus, and $27.92 per day figuring in the prize awards.

The coal, which was of the Island Creek seam, was free from impurities; a No. 3 shovel and a breast auger were used by Jerry Dunn for loading and drilling shotholes respectively except that about 25 per cent of the drilling was done by electric coal augers; the working place was dry; the coal was shot by Monobel; two tracks were laid in the 36-ft. room and a gathering locomotive supplied the cars.

Cost and Track Data and Other Facts Relating to Upkeep of Mine-Locomotive Wheels and Tires*

Worn Wheels Make Locomotive Parts Drag Roadway, Causing Wrecks —Tables Showing Commercial Sizes of Wheels—Replacing, Resurfacing, Rebuilding and Grinding Tires—Frog and Switch Formulas

GREAT is the need for a detailed investigation of mine-locomotive wheels and tires, their care and maintenance. Mechanical engineers should thoroughly analyze the conditions to which such equipment is subjected and determine those which are favorable and find methods of remedying shortcomings.

Too much of the so-called "experience" related and "advice" given is not based upon investigation but is handed down time after time and used as a remedy for all conditions, little thought being given to the original circumstances to which it had reference. Personal favoritism and prejudices enter into such experiences or advice, and as such are without much weight. If you can back your practices by facts developed from research, time will be saved and waste prevented.

The time required for a thorough research or investigation into this subject is not a matter of a few weeks or months. It can come only as the result of records which have been well and industriously kept for years, in which is shown the service received, maintenance required and the conditions encountered for each of the various classes of wheels and tires. Until you keep a record of these things you will be at a loss to know what service to expect under conditions obtaining and will be unable to compare the relative merits of the different types of wheels and tires.

The standardization of these parts is of mutual interest to manufacturers and coal companies. The chairman of the committee on "Mine Locomotive Wheels and Tires" of the Electric Power Club, which is investigating the subject, informs us that they will soon recommend such standards.

It is to be hoped that these specifications will be such as can readily be adopted by manufacturers and local companies, and that the committee will be found to have based its investigations as to these standards upon actual conditions met in the mines rather than on a too liberal use of theory or on tests made on factory tracks.

Some of these proposed standards could be announced, but until the Power Club Committee has completed its recommendations these details will not help you to resurface the worn tires and wheels that lie waiting at the mine for your return.

To appreciate more fully how important it is to take proper care of wheels and tires let us consider for a moment the interrelation between tracks and locomotives. Badly worn wheels and tires invariably cause poor track, and poor track generally causes excessive wear on wheels and tires. Some coal companies permit their locomotives to operate through pools of water, over muck-covered rails and through sands that literally grind out the bearings. Where the responsible parties are ignorant of such conditions or believe it is an economy to ignore them they continue to add heavily to the cost of mine operation.

When we look back to the day of mules, from our present electrified mines, it recalls to us the manner in which we figured their values. It was obvious to anyone that a mule's value continually became smaller with passing years. Given two mules with a difference in age of five years but equal in all other respects, the younger one was worth more money, for, barring extraordinary circumstances, it was practically certain that he would outlive the older. The mule had a limited life and consequently as year by year elapsed he possessed less potentiality for usefulness and his value accordingly decreased.

The mine locomotive has a period of life just as defi-

NOTE—Frontispiece shows locomotive and trip in the mines of the Woodward Iron Co., at Mulga, Ala.

*Report of committee on mine-locomotive wheels and tires to be made to the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers at its session in Huntington, W. Va., Sept. 19 to 22. The committee consists of J. J. Fluck (chairman), E. D. Knight, J. H. Petty and P. C. Miller.

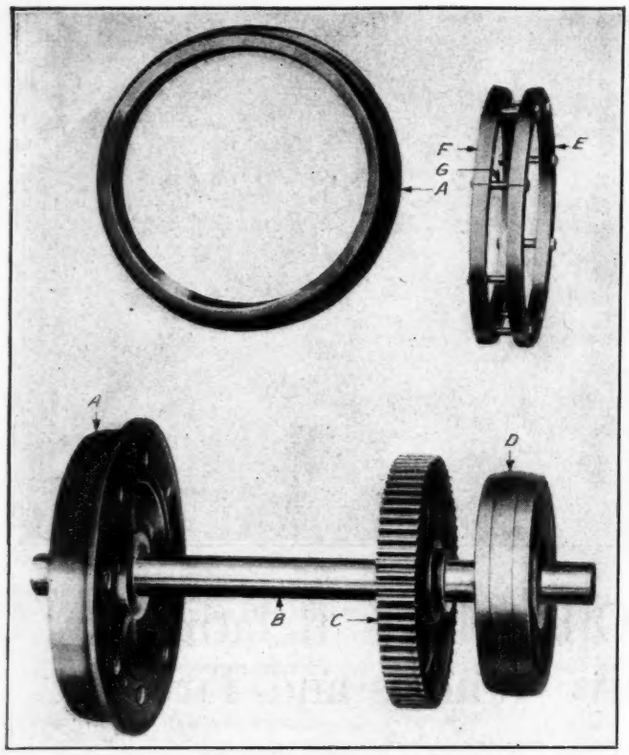


FIG. 1—DEMOUNTABLE TIRE FOR LOCOMOTIVE WHEELS

A is the demountable tire; *B*, the axle; *C*, the solid gear; *D*, the wheel center; *E*, the outside retaining ring; *F*, the inside retaining ring, and *G*, the bolt for the rings.

nite as a mule and consequently is just as sure to depreciate in value. With a mine locomotive running day after day for months, doing its assigned work without any apparent loss of efficiency, it seldom strikes some people that it is in any other than the best of condition. Every machinist knows well that a silent lessening of its value is going on and that eventually it must be abandoned.

Barring obsolescence, the life and depreciation of any mine locomotive will vary according to the conditions under which it operates and more particularly upon whether timely or untimely repairs are made. Its parts subjected to the hardest wear should naturally receive first consideration in maintenance; if they do not, the life of the locomotive will be greatly shortened by this neglect.

You will notice instances where wheels and tires are worn so badly or resurfaced so often that parts of the locomotive will drag on the bottom or catch on switches or cross-rails. Many wrecks can be attributed wholly to this cause, and the loss due to the delays they occasion and to the damage done will far exceed the expense which would have been incurred had the wheels been duly re-tired.

The damaging effect of badly grooved wheels on mine track is seemingly slow, but track subjected to such conditions will depreciate 10 per cent faster than other track carrying an equal volume of traffic but traversed by locomotives having well-surfaced wheels. Without good haulage roads the mine cannot be operated successfully, and care always must be taken to keep transportation facilities favorable by good track and by prompt attention to the needs of the haulage equipment.

If you are at all interested in the condition of your locomotive, you cannot afford not to be just as interested in the mine tracks. If you boost for good locomotives, boost first for good track on which to run them. You may not be responsible for the maintenance of the tracks, but report their inequalities to those who are. Keep on reporting them until to keep you quiet they are put in proper order.

Keep the maintenance of the locomotive wheels and tires one step ahead of that of the track and there can be no retaliation. About 20 per cent of all accidents in the mining industry are due to haulage. In all probability 50 per cent of these are due to poor track, wheels and tires. Investigate as many wrecks as possible and remedy the conditions that cause them wherever you can. Some general track formulas are listed in this article for this specifc purpose.

In many cases it is impossible without first removing the trucks from the locomotive to determine the exact diameter of the wheel centers for which tires are to be purchased. Some tires have a shoulder which extends over the outer rim of the wheel center, and owing to the design of the locomotive it is impossible to measure on the inner side of the wheel. Locomotives are left to

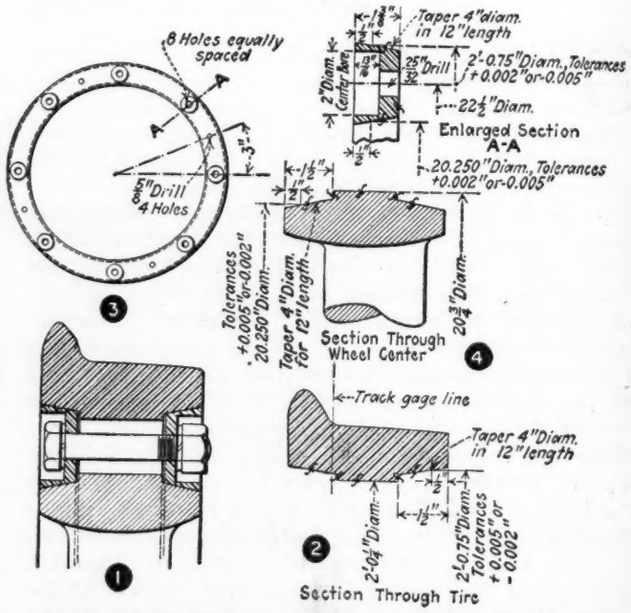


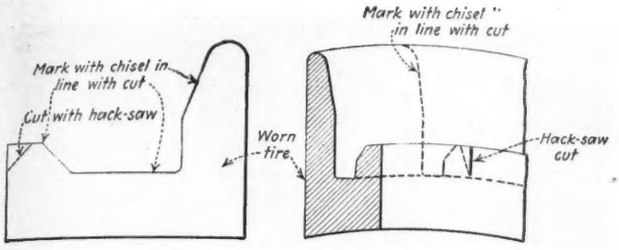
FIG. 2—ELEVATION OF WEDGING RING AND CROSS SECTIONS OF DEMOUNTABLE TIRE

At 1 is shown how the tire is wedged into place by two rings having tapering surfaces which press against the tire as the bolts are tightened up. At 2 is shown a cross-section of the tire, in which an *f* shows the finished surfaces. The diameter is at no point allowed to be 0.005 in. larger or 0.002 in. smaller than standard. At 3 one of the rings is shown and in 4 the wheel center with its finished surfaces, *f*.

TABLE I. EXACT DIAMETER OF WHEEL CENTERS IN GENERAL USE FOR TIRES OF THE OUTSIDE DIAMETER SHOWN

	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Outside diameter of tire	14	16	18	20	22	24	26	28	30	33	36
General Electric	..	...	14½	16½	18½	20½	22½	24 9/16	26 9/16	29 9/16	...
Goodman	..	13¼	15	15	19	19½	...	23	25	27½	30½
Jeffrey	..	14	16	18	20	22	24	26	27¾	30¾	..
Ironton	10.5156	...	14.016	...	18.022	20.0242	...	....	....	....	...
Mancha	Solid rolled-steel wheels 16 and 19-in. diameters										
Morgan-Gardner	..	...	18¼ (14)*	...	22½ (18½)	...	26¼ (22)	28¼ (24)	30¼ (26)	31 (26)	...

* Under Morgan-Gardner sizes expressed thus: 18¼ (14); 18¼ is the outside diameter of tire and 14 the diameter of wheel center, both in inches.



METHOD OF BREAKING TIRE WITH SAW AND CHISEL

A deep cut is made with a hacksaw in the worn tire at the edge of the tread, and a chisel mark is made on the flange and also on that part of the tread where the saw cannot reach. A 45-deg. chisel is put in the hacksaw cut and struck with a 20-lb. sledge. One blow should break the tire.

run on worn wheels because the management believes it cannot afford to stop them long enough to remove the trucks for the taking of these measurements.

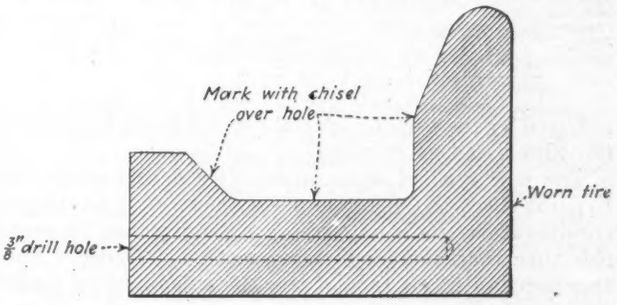
If the record of the sizes and performance of tires to which we have previously referred were kept this trouble would be eliminated. Rarely is information to be found on hand around the mine giving general data on the sizes of tires and wheel centers, and for this reason information of this kind has been sought from several manufacturers, and it is listed herewith. All mine-locomotive wheel and tire manufacturers should indicate on all wheels and tires in some permanent manner their exact diameters, widths and thicknesses.

On Curves, Flanges and Tires Wear Unequally

Where curves in the mine tracks are in one general direction, the flanges and tires on the outside-rail side usually will wear faster than those on the opposite side. Under general haulage conditions in the mines it is also often found that the wheels or tires on the gear end of the locomotive wear much faster than those on the opposite end, but that the flanges on the gear side do not wear thin as fast as those on the opposite side.

The wear on wheels, tires and brake shoes is materially reduced by the use of a dynamic-braking controller on the locomotive, for a heavy downgrade can be negotiated under heavy load without putting on the brakes and sliding the wheels, and because in stopping a trip the brake shoes have to be applied only after the controller has reduced the speed of the locomotive to practically zero. With this controller the motors are connected in series. This reduces the possibility of spinning the wheels when starting a trip.

The dynamic method of braking is accomplished by connecting the motors as generators. By proper manipulation of the controller when the motors are so acting the controller will regulate the resistance sufficiently to produce the desired braking effect.



HOW TO BREAK TIRE FROM WHEEL WITH DYNAMITE

The worn tire is drilled with a ⅜-in. hole and scored by the chisel above the hole. The drillhole is then filled with dynamite and detonated with a cap.

In removing tires from wheel centers it is customary to heat them with a gasoline or kerosene torch, upending the axle so that the wheels can be imbedded in a fire, air under pressure being supplied through a circular pipe fitting around the wheel. They also are frequently

FIG. 5

Preparing to Turn Badly Grooved Tread

Too often a tire that has become badly grooved is allowed to run on long after prudence would favor its resurfacing or removal. It is probable that if the turning, when turning is all that is needed, could be done without the locomotive being laid off during operating hours it would be far more frequently done with less risk of derailment and less hazard to life and injury to property. A mine is fortunate indeed if it has motive power enough so that one of its locomotives can always be in storage or can be readily spared so that at any time it can be put in the best of condition for safe and efficient operation. This illustration shows a lathe in the workshops of the Arrow Coal Co., Rockingham, Pa.

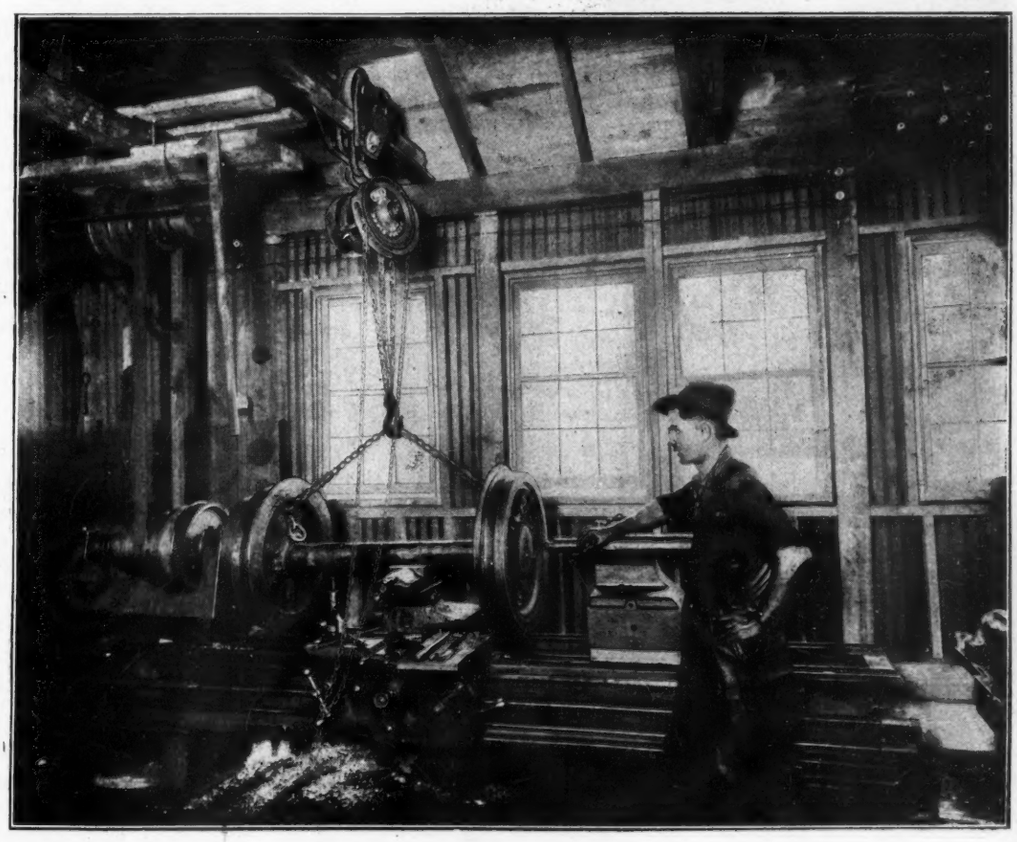


TABLE II. THICKNESS OF TIRES IN GENERAL USE ON LOCOMOTIVE OF WEIGHT SHOWN

Weight, tons	4	5	6	8	10	13	15	20
General Electric, inches	1⅜	..	1½	1⅝	1¾	1¾	1¾	1⅞
Goodman, inches	2¼	2¼	2¼	2¼	2¼	2¼	2¼	2¼
Ironton, inches	1½	2	2	2	..	..	..	..
Mancha	Rolled steel wheels face ⅞ in. deep on outside of rim							
Morgan-Gardner, inches	2¼	2¼	2¼	2¼	2¼	2¼	2¼	..
Jeffrey	2 in. for 26 in. and 28 in. wheels having width of 4⅛ in. and 3¾ in.							
Jeffrey	2 in. for 24 in. and under having width of 3¾ in.							
Jeffrey	2¼ in. for 30 in. and 33 in. wheels having width of 4⅛ in. and 3¾ in.							

TABLE III. WIDTH OF TIRES IN GENERAL USE ON LOCOMOTIVES OF WEIGHT SHOWN

Weight, tons	4	5	6	8	10	13	15	20
General Electric, inches	3½	..	3½	3½	3½	3½	3½	3½
Goodman, inches	4	4	4	4	4	4½	4½	5
Ironton, inches	4½	4½	4½	4½	..	..	..	..
Mancha, inches	3½	3½	3½	3½	3½	..	..	..
Morgan-Gardner, inches	4	4	4	4	4	4	4	..
Jeffrey	3¾ in. on 24 in. wheels or under. 3¾ in. and 4¼ in. on 26 in., 28 in., 30 in. and 33 in. wheels							

removed by the use of a special type of forge over which the wheels can be revolved.

The new type of demountable tire developed by the General Electric Co. for mine locomotives is worthy of consideration, for such tires can be removed in much less time than those which are not so designed. Furthermore, with this type of tire the axle or wheel center is not subjected to excessive heat such as is sometimes developed when tires are removed by other methods.

When tires are worn to a point where they must be discarded it is better to break them by the methods shown in Figs. 1 and 2 than to remove them by heating.

Only in a few cases are the machine shops at the coal mines equipped with a tire lathe—that is, one that will turn two tires at one time and do it without the prior

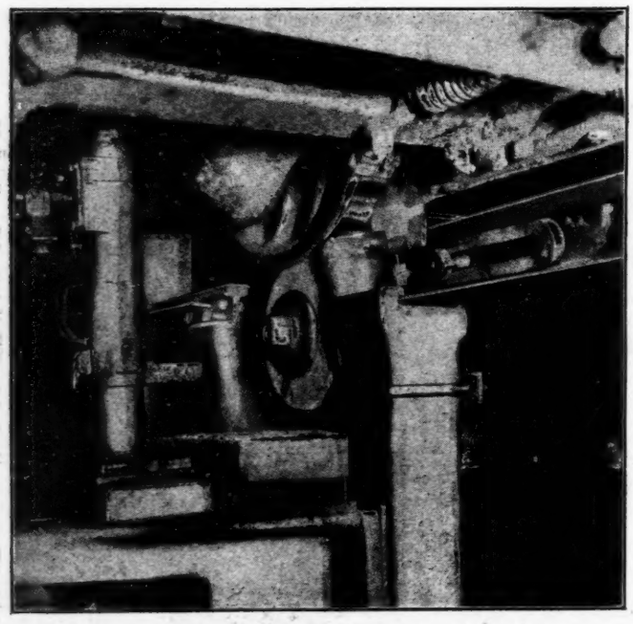


FIG. 6—GRINDING WHEELS WHILE STILL IN PLACE

Many times would wheels be surfaced if only it could be done quickly and without removing them from the locomotive. Delay is likely to be the cause of disastrous wrecks.

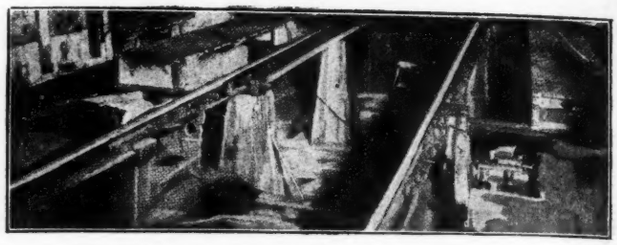


FIG. 7—SHOWING HOW GRINDING WHEELS ARE LOCATED

The grinding wheels are placed just outside the track. The adjacent rail section in each case can be removed and the grinding wheels shifted over so as to come immediately under the wheels to be ground. The locomotive is supported during the grinding by jacks.

annealing of the metal. A lathe of this type will turn two tires in two hours. The small lathe usually found at the mines cannot turn tires unless they have been annealed, for the lathe cannot cut the hard crystallized surface which has developed on them. Before placing the tires on such a lathe they must be annealed to a dull red and allowed to cool naturally in air.

They are generally shrunk on the wheel center while cooling and they are then resurfaced. If the tire is turned by the use of chucks it must be reheated after turning and shrunk on the wheel center. Three tires a day is a fair average for this method of turning. In either case when the tire is being turned a drip composed of two parts petroleum and one part turpentine should be used for lubrication.

The use of abrasive brake shoes has done much to retain the proper contour of the wheel or tires. The grades on the haulage roads have much bearing upon the manner in which they should be used. To eliminate undue wear upon the wheels and tires they must be interchanged in many cases with common brake shoes.

A grinding machine has been placed on the market for the resurfacing of tires. It is so designed and operated that the tires can be ground without removing the trucks from the locomotive. The grinding wheels are on the same elevation as the track, and the motor

TABLE IV. WHEEL BASE IN GENERAL USE ON LOCOMOTIVES OF WEIGHT SHOWN

Weight, tons	4	5	6	8	10	13	15	20
General Electric, inches	37 and 44	..	44	46	61	61	72	..
Goodman, inches	40	42	44	48	66	66	66	74
Ironton, inches	36	36	36	36	..	..	..	..
Mancha, inches	29½	32½	29½	36½	44½	..	..	..
Morgan-Gardner, inches	24	35½	29½	42½	41	48	48	..

TABLE V. COST OF REBUILDING TIRE BY ELECTRIC WELDING

Operation of machine per hour at 1½c. per kw.-hr	$0.11
Operator per hour	.60
Electrode, per hour (2 lb.)	.16
Total	$0.87
Ten hours labor required for two tires	8.70
Turning to contour, 3 hours at 60c	1.80
Total average for two tires	$10.50
Total average per tire	5.25
For comparative figures let us assume costs as follows:	
Cost of one new tire	$30.00
Resurfacing one tire in lathe	6.00
Rebuilding by electric welding	5.00

Assuming that tires are turned once a year by the lathe, the locomotive maintenance costs per tire for any given period, all conditions being equal, would be as in Table VII.

TABLE VI. TIRE COSTS WHEN TIRES ARE ONLY SURFACED AND REPLACED

Number of Turnings That Tire Will Permit	Years	Cost in Dollars per Tire Resurfaced and Replaced for a 16-Year Period														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
None	30	60	90	120	150	180	210	240	270	300	330	360	390	410	440	470
One	30	36	66	72	102	108	138	144	174	180	210	216	246	252	282	288
Two	30	36	42	72	78	84	114	120	126	156	162	168	198	204	210	216
Three	30	36	42	48	78	84	90	96	126	132	138	144	174	180	186	192

Life of one tire indicated by heavy line.

TABLE VII. TIRE COSTS WHEN TIRES ARE SURFACED, WELDED AND REPAIRED

Number of Turnings That Tires Will Permit	Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Based Upon Three Re-fillings by Electric Welder. Life in Years and Costs in Dollars per Tire.															
None		30	35	40	45	75	80	85	90	120	125	130	135	165	170	175	180
One		30	35	40	45	51	56	61	66	96	101	106	111	117	122	127	132
Two		30	35	40	45	51	56	61	66	72	77	82	87	117	122	127	132
Three		30	35	40	45	51	56	61	66	72	77	82	87	93	98	103	108

Life of one tire indicated by heavy line.

is run into position as if it were being spotted over a pit in the machine shop. A limited inquiry into the merits of this machine discloses quite a difference of opinion as to its performance and results. It cannot be condemned or recommended until a thorough investigation has been made and until several questions have been answered by practical experience:

(1) When grinding the locomotive wheels are turned by the friction of the grinding wheels. This may prove satisfactorily on a special type of locomotive but will it work well on all types?
(2) If there is ½ in. or more play in the journal boxes caused by worn bearings or wheel hubs, how can the flanges be prevented from playing on the grinding wheel?
(3) If two tires are worn unequally or to different diameters how will the two be reground to the same diameter in one operation?
(4) How many tires per day can be resurfaced?
(5) As either the lathe or the electric welder can be placed in constant service for general repair work as well as to resurface tires, will the investment, interest and maintenance costs for a grinding machine, which has only one definite use, be justified by the saving that its use affords? If not its installation will be unwarranted.

Building up worn tires and wheels successfully and economically with the use of the electric welder requires an operator who has by experience acquired the technique of manipulating the electrodes and their application to the various classes of welding.

For building up tires a $\frac{5}{16}$-in. metallic electrode does the best work but more speed can be made with one of ¼-in. diameter. The $\frac{5}{16}$-in. electrode requires 200 to 250 amperes whereas the ¼-in. requires from 250 to 300.

The worn space to be filled up, using a 26-in. tire as a fair example, will require on an average about 10 lb. of metal. A competent operator should fill this in at the rate of 2 lb. per hour. At this rate two tires could be rebuilt in ten hours.

In general practice around the coal mines the tires are placed flat upon a turntable at a convenient working height. The welding is then done in 2- to 3-in. sections at a time, starting at the flange and welding across the tread and in four equidistant points around the tire. If instead of removing the tire and placing it on a turntable the locomotive truck is set up on a pedestal the operator will make two welds, one on each tire, while in the one position, then roll the axle 180 deg. and repeat the welding, and so on until the original weld is reached.

Such a procedure holds the localized heat to an absolute minimum, and this becomes more essential as the carbon content of the metallic electrode is increased. An electrode having 0.10 per cent carbon or less will give complete satisfaction. However, if it is desired to use a rod having approximately the same carbon content as the tire itself, there are no difficulties, except that the price is slightly higher per pound.

For tire work no metallic electrodes in which the carbon is in excess of 0.75 per cent should be used, for with the harder metal it seems difficult to prevent local strains. Tires will break by using this high-carbon metal because the local strains cannot be compensated.

How to handle the resulting tire after it is built up doubtless will puzzle operators who are not equipped with lathes large enough to swing an axle complete, much less the larger size tire. A portable grinding wheel satisfactorily overcomes this condition. It is possible to use these tires without turning if the operator has put on the finishing layer expertly.

It is claimed for the electric welder that a tire can be built up three times after each surfacing. Upon this assertion, using prices as indicated above, the life and maintenance cost per tire would be as in Table VII.

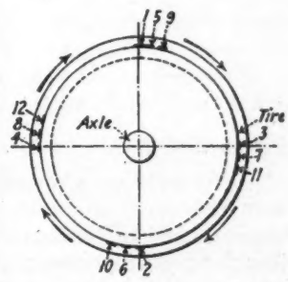
As it is not considered profitable in general practice to rebuild flanges on tires, the flanges in all probability will be worn beyond repair before the tires could remain in service for a life such as indicated above. Many mine locomotives are designed so that the wheels cannot be resurfaced, and must be maintained as near their original diameter as possible, this because of the underhangings of the locomotive, which if lowered by worn wheels will catch on switches, etc.

The electric welder has its advantages in cases like this, and it means a considerable saving. When one wheel is worn deeper than the other, it is necessary to resurface both wheels to the diameter of the one worn

FIG. 8

HOW TO PLACE METAL IN ELECTRIC WELDING

The applications of metal to the surface of the tire should be made in the order shown and continued till the whole tread has been built up to the required diameter.



the deepest, thereby unnecessarily shortening the life of the other tire, but by rebuilding the tires electrically this waste is eliminated.

A locomotive having the minimum height above the rail has many advantages, but it is always well to investigate the conditions, prepared if possible to sacrifice a few inches of height in order to allow space for the complete utilization of tires and if possible to use tires as much as one inch oversize.

TABLE VIII. FROG AND SWITCH FORMULAS

When l = lead rail in feet, g = gage of track in feet, n = number of frog, r = radius to center line of track in feet, x = length of switch latch in feet, d = clearance between hinge of latch and rail in feet, then

$$n = \frac{36 \text{ in.}}{\text{spread in inches, 3 ft. from frog point}}$$

$$l = 2gn; \quad r = nl; \quad x = 2rd$$

To estimate required increase in gage on curves:
When r = radius to center line of track in inches, w = wheel base in inches, d = diameter of wheel in inches, o = height of flange in inches, and l = a constant.

Then $L = \sqrt{o(d - o)}$; $x = \frac{w + L}{r}$ × sine of angle.

1 — cosine of angle = versed angle
r in inches times versed sine = x or distance in inches gage must be increased

To find the minimum radius of curves for various wheel bases and wheel sizes, assuming the curves to be properly gaged
When R = minimum radius of curve in feet; B = wheel base in inches and C = a constant and the ratio $B:R$.

Wheel Diameter in Inches	C	Wheel Diameter in Inches	C
12	4.66	24	2.53
14	3.99	30	2.32
16	3.49	33	2.17
18	3.10	36	2.14
20	2.81		

Relative Merits of Storage-Battery, Combination and Conductor-Cable-Reel Gathering Locomotives*

Believed That Larger Capacity Straight Battery Type Might Show Rate Two Cents per Ton Lower Than Combination—Reel Type Fits Heavy Grades; Combination, Medium Grades and Straight Battery, Low Grades

THE authors of this paper hope that the relative merits of the various types of locomotives now in use have been laid down in this article without bias, the sole purpose of preparing it being to bring to light the advantages of one class of gathering locomotive over another under certain specified conditions. This is done for the benefit of those who have invested or who may be contemplating investing their money in motor equipment.

Mining and electrical men of recent years have much discussed the merits of the different kinds of gathering locomotives, practically all of which will come under the three classifications named in the title. Widely differing experiences have been reported. There is reason to believe that much prejudice has crept into the argument because of the misapplication of the equipment and the slowness of all human beings to admit their mistakes and accept new developments. Therefore this article will be confined to facts so far as the members of this committee have been able to obtain them, associated, we hope, with logical reasoning.

All Three Machines Have Their Proper Place

In this way, with no selfish end in view, we hope to show the relative merits of straight storage-battery, combination and conductor-cable-reel gathering locomotives from an operating point of view. This will be done primarily under what we consider average mining conditions, but we will state before going further that we expect to find an economical place or condition for each of the above classifications.

Before presenting any data it is in order to discuss briefly how and under what conditions these data have been obtained and compiled, and the kind and size of the equipment considered.

Records of Nineteen Locomotives Collected

Records of nineteen gathering locomotives have entered into this comparison. They are owned and operated by the Logan Mining Co. in the Logan field. These motors are classified as follows: Nine combination storage-battery machines, all equipped with 88-cell lead batteries, all 13-plate except one, which is a 15-plate cell; seven straight storage-battery machines all 48-cell, lead, two 17-plate, three 19-plate, two 21-plate, making the average 19 plates; three locomotives of the conductor-cable-reel type.

These locomotives are not all at one mine but are divided as follows among four operations: One mine has one straight battery and one cable-reel machine; another has four combination machines that gather and trip their coal to the slope bottom; another has four straight battery, two combination and two cable-reel machines; the remaining mine has two straight battery and two combination locomotives.

The coal beds at the four mines range from 5 to 6.5 ft. in thickness and are generally considered level, but have numerous local dips ranging up to 4 per cent. These of course will average about "fifty-fifty" in favor of and against the loads. In general these mines have what would be considered good average mining conditions. Forty-pound steel is laid on all main haulways and 20-lb. in all butt entries and rooms.

Locomotive Maintenance Costs Closely Kept

This company has kept an extremely accurate maintenance-cost system on the practical operation of its locomotives from March 1, 1920, to date. It is through the courtesy of this firm, the chairman of this committee being an employee in the capacity of chief electrician, that we have been given access to a large part of the facts that will be presented in this paper with the assurance of their reliability.

A monthly cost record is kept of each locomotive on standard forms printed for this purpose. The electrician at each mine makes an itemized record of each repair part used, the date of its installation, and the number of hours consumed in making the repairs. Also on this same sheet the daily tonnage of each locomotive is accurately kept. When a new battery is installed and after a deduction is made for credit on the old battery returned to the manufacturer the rest is charged monthly with depreciation calculated on a two-year life, stopping the charge at the end of two years where the battery exceeds the estimated life or doubling up during the last months should the battery perchance fall short of that period of usefulness.

Maintenance of the batteries, including the replacement of water, is recorded on these sheets, and at the end of the month the results are totaled up, showing the tonnage, total cost and cost per ton for the month. One or two good months will not be picked from these records and a comparison made from these, but the records back to March 1, 1920, covering a continuous operating period of twenty-seven months, terminating June 1, 1922, will be taken. A point that we wish to emphasize here is the length of the time interval that these records cover. The experience over a number of months is essential if figures of this nature are to furnish reliable indications.

The many conflicting stories and reports on the subject under consideration doubtless arise from the fact that the most of us do not dig deep enough when making comparisons or drawing conclusions. Offhand it might seem that compiling and comparing the records mentioned above would be all that would be necessary to settle this question, but it is not, because this compilation does not represent more than 30 per cent of the cost that should be entered against these locomotives

*Report of committee on "Relative Merits of Storage-Battery, Combination and Conductor-Cable-Reel Gathering Locomotives," to be presented Sept. 20 at the meeting of the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, at its session to be held Sept. 19-22 at Huntington, W. Va. Committee consists of C. E. Rogers (chairman), L. C. McAllister, H. R. Wegert and J. Lewis Dawson.

and introduced when making such comparisons. We must not be satisfied till we have reduced every possible alleged advantage or disadvantage to facts or figures. It matters not what claims may be put forth; if they fail to show a reduced cost per ton they are not worth considering, for this is the vital point of interest and is the only characteristic that can really be counted of advantage. In other words this is not a question of individual likes or dislikes, it is a question of dollars and cents. After our data are exhausted, however, we will consider some of the points of advantage for which we have no substantiating figures.

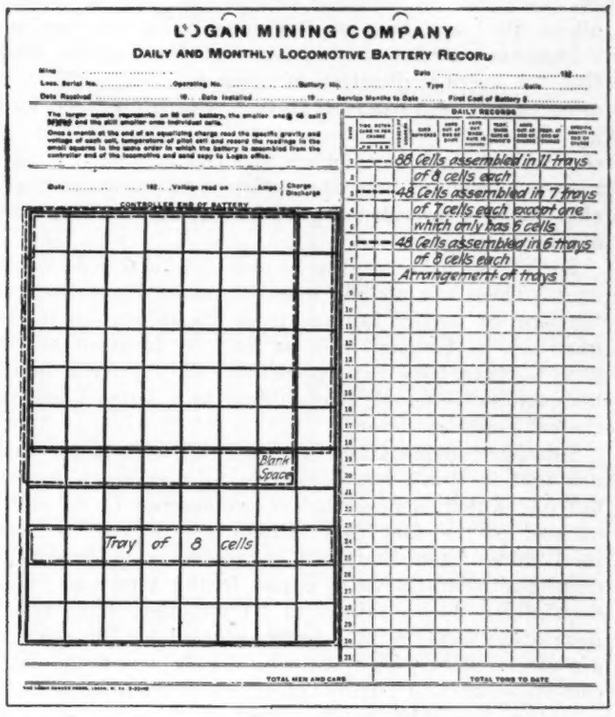
The largest item of cost entered is for the wages of motormen and brakemen. The average wage these operatives received during the period under consideration was $5.59 per 8-hour day, the mines working 404.5 eight-hour shifts during this time. The next important item is the power-demand charge, which in this locality is based on the highest integrated 5-minute peak that occurs during a month. This charge is $1.80 per kilowatt per month, and to it the regular charge for energy must be added. By the use of straight storage-battery locomotives this demand charge is at a minimum, as the day load is reduced and the power consumption spread out more evenly throughout the 24 hours of the day. The straight battery machine being the most economical from this point of view we take it for a base.

Accordingly we must charge the cable-reel locomotives with a demand equal to the capacity of their motors, which is 30 kw., as they all draw their power from the trolley and do it during the day shift, when the maximum load is on. The motor capacity of the combination locomotives is 20 kw. Apparently they should be charged with 20 kw. of demand, but as they operate from the trolley only 20 per cent of the time they rarely ever all draw their maximum capacity from the system at the same time. Consequently they are charged with 75 per cent of their capacity, which is 15 kw. per locomotive per month.

Charges Against Machines That Use Trolley

Reel and combination locomotives are charged with increased copper, trolley hangers, bonds and labor for bonding butt entries, but these charges are spread out over the total tonnage of a 1,000x300-ft. panel in a 5-ft. seam with 80 per cent recovery. The maintenance cost of the wire and bonding is not considered, as it will just about offset the value of this material when the entry or panel is worked out. But there is another charge of like nature. It is well known that if cable-reel or combination gathering locomotives are being used more substation capacity and more copper in the whole transmission system are required because a greater percentage of the total power consumption is being used in a shorter period than would be the case where straight storage-battery machines were being employed. Hence these two charges must be made against these two types of locomotives. They are divided between them in about the same proportion as the demand charge, but they are based on the total tonnage of an average-size lease or mine.

We have investigated and reduced to conservative figures another claim or charge that must be made against the cable-reel gathering locomotive. This is power failure or interruption. It is certain that if this type of locomotive is being used when there is such failure or interruption the whole mine comes to a dead


LOGAN MINING COMPANY

DAILY AND MONTHLY LOCOMOTIVE BATTERY RECORD

DAILY RECORDS

88 Cells assembled in 11 trays of 8 cells each

48 Cells assembled in 7 trays of 7 cells each except one which only has 6 cells

48 Cells assembled in 6 trays of 8 cells each

Arrangement of trays

Blank Space

Tray of 8 cells

TOTAL MEN AND CARS

TOTAL TONS TO DATE

stop almost instantly, so far as the moving or transportation of coal to the tipple is concerned.

When failures of 10, 20 or 40 minutes duration occur does the cost stop? Most assuredly not. Can we prevent these interruptions? No; they are not within our reach. Are they the fault of the locomotive? They certainly are. They should continue working, power or no power, for that is just what a battery locomotive does. Consequently we must admit that when it comes to the question of considering merits and demerits the reel type of locomotive should be charged with at least a portion of the additional cost arising from this weakness and inflexibility.

The power company's record in this locality from a time standpoint shows 98 per cent supply. This means that during 2 per cent of the time no power is available at the mines, and we accept this as a pretty fair degree of service. But it also means that on an average during 28.8 minutes out of every 24 hours no power is available. It is reasonable furthermore to believe that 75 per cent of this failure will come during the 8-hour working shift, because this is the period of heaviest load. This being the case, the period when power is lacking averages 21.6 minutes during each working shift, or is equivalent to 4.5 per cent of the working time.

Assuming the average cost of production throughout the period of time under consideration as being about $1.75 per ton, 4.5 per cent of this is 7.88c. of cost per ton arising from power failure. The coal company's records show that the mines operated only about half time and as power failure would not be particularly injurious on the days when coal was not actually being produced we cut the above figure in half, which still leaves 3.94c. per ton. Because this figure still looks too high and because we might have overlooked something this charge is further cut and entered against the reel-type gatherer at 1.75c. per ton.

We realize that a battery locomotive could not continue its work over any protracted period of time should

the power not be restored, because the mine cars would all be filled and because the mine could not continue to operate without ventilation, but the records show that the average duration of these failures is 15 to 20 minutes. It is obvious that with storage-battery locomotives these short interruptions are scarcely felt, as the main-haulage locomotives and tipples almost always have a surplus of capacity sufficient to overcome these short delays, provided the loaders at the working face are kept going.

So far, we have considered only the total power failures. These are not all, however, as in all probability the local or partial failures from the substation to the mine are as frequent and as long in duration as the total failures. We have no definite data on this detail, however, so we merely drop it here as a demerit against the cable-reel gatherer.

Another consideration in connection with power failure that we have not been able to convert to figures but one which is nevertheless pronounced in its effect on cost is the fact that miners are difficult to hold in a mine when they fail to receive cars promptly, especially when the delay comes in the afternoon; consequently a power failure of 30 minutes in the afternoon often leaves a mine badly crippled for the remainder of the shift. To those who closely watch the daily cost statements of a mine the effects of such happenings are often noticeable to the extent of 25 or 30c. per ton.

We conclude here the description of how the data to be presented have been assembled. We have been highly conservative in the few estimated figures entering into this comparison, and without question the locomotives against which charges have been made have been given the benefit of all doubt. Therefore, Table I is presented to show the relative merits of combination, straight battery and conductor-cable-reel locomotives.

TABLE I—RELATIVE MERITS OF COMBINATION, STRAIGHT BATTERY AND CONDUCTOR-CABLE-REEL LOCOMOTIVES

Tonnage Data

Locomotives	Total Tons	Tons per Locomotive	Tons per Locomotive per 8-hr. Day
9 Combination	735,543	70,615.9	174.6
7 Straight battery	355,852	50,836.0	125.7
3 Conductor cable-reel	150,307	50,102.3	123.9
Total	1,241,702	60,089.6	148.6
Percentage			
Combination			100.00
Straight battery			71.99
Cable reel			70.96

Cost Data on Nine Combination Locomotives

		Cost per ton, Cents
Total repair cost	$13,431.49	2.11
Total battery depreciation	19,774.50	3.11
Increased power demand, 15 kw. x $1.80 x 9 x 27	6,565.00	1.03
Increased cost of wire and of bonding butt entries	1,334.64	.21
Increased substation capacity	254.22	.04
Increased main feeders and main-line bonding	63.55	.01
Operating cost 404.5 days at $5.59 x 2 x 9	40,700.79	6.40
Totals	$82,124.19	12.91

Cost Data on Seven Straight Storage Battery Locomotives

Total repair cost	$3,657.75	1.03
Total battery depreciation	10,385.10	2.92
Operating costs 404.5 days at $5.59 x 2 x 7	31,656.17	8.89
Totals	$45,699.02	12.84

Cost Data on Three Conductor-Cable-Reel Locomotives

Total repair cost	$3,394.78	2.26
Increased power demand 30 kw. at $1.80 x 3 x 27	4,381.29	2.91
Increased cost of wire and of bonding butt entries	1,608.28	1.07
Increased cost of main feeders and main-line bonding	90.18	0.06
Increased substation capacity	270.55	0.18
Cost arising from power interruptions	2,630.37	1.75
Operating cost 404.5 days at $5.59 x 2 x 3	13,566.93	9.03
Totals	$25,942.38	17.26

Aggregate Cost Data on Nineteen Locomotives

Total tons 1,141,702; Total cost $153,765.59; Average cost per ton 13.47c.

Advantages

Battery over combination 0.07c. per ton, saving on above tonnage	$799.19
Battery over reel type 4.42c. per ton, saving on above tonnage	50,463.23
Combination over reel type 4.35c. per ton, saving on above tonnage	49,664.04

The foregoing tabulated data show that the straight storage-battery locomotives have an advantage of 0.07c. per ton over the combination machines. Although this is correct, if we stop here we will not do justice to the straight battery locomotive; therefore we present Table II, showing the comparative capacity of the two.

TABLE II—CAPACITY OF COMBINATION AND STORAGE-BATTERY LOCOMOTIVES

	Cells	Plates	Total Positive Plates	Kw.-hr. Capacity, 6 hr.
Combination	88	13	528	35.38
Straight battery	48	19	432	28.94

From this it may be seen that the combination machine drawing 20 per cent of its power from the trolley has a battery equivalent of 44.23 kw.-hr., which gives it an advantage of 35 per cent in capacity over the straight battery locomotive. The table of percentage shows that the combination has led the straight battery machine by only 28 per cent in tonnage notwithstanding its 35 per cent advantage in capacity.

Increasing Size of Storage-Battery Machine

This difference in tonnage cannot be traced to anything but a difference in capacity resulting from the fact that the mileage rating of both types of locomotives under consideration is the same when operating from the batteries, but the combination has 42 per cent advantage in speed over the straight battery machine while operating from the trolley, providing 250-volt pressure is maintained on the section from which cars are being gathered. This latter condition is possible but not practical, consequently we drop this apparent advantage and assume that the straight battery machine equipped with the same capacity as the combination locomotive will gather the same tonnage under the conditions being considered. This would require about a 27- instead of a 19-plate battery, which is approximately a 50-per cent increase.

If we go back to the data in Table I referring to the seven straight battery locomotives and increase the battery depreciation 50 per cent and the repair cost and tonnage 28 per cent based on the combination tonnage, while the operating cost remains the same, it will give the results set forth in Table III, showing what the cost and tonnage figures would have been on these locomotives had they been equipped with this additional capacity.

TABLE III—TOTAL TONS INCREASED BY 38.9 PER CENT, OR FROM 355,852 TO 494,278

		Cost per Ton, Cents
Total repair cost increased by 38.9% or from $3,657.75 to $5,080.54		1.03
Total battery depreciation by 50% or from 10,385.10 to 15,577.65		3.15
Operating cost remaining the same	31,656.17	6.40
Totals	$52,314.36	10.58

Had the data already given in this paper been procurable at the time the above equipment was purchased Table IV could have been prepared.

TABLE IV—RELATIVE MERITS OF STORAGE-BATTERY, COMBINATION AND CONDUCTOR-CABLE-REEL GATHERING LOCOMOTIVES, LOGAN MINING CO.

Advantage of Straight Battery Locomotives

Over combination 2.33c. per ton. Saving on total tonnage	$26,601.66
Over reel type 6.68c. per ton. Saving on total tonnage	76,265.69

By comparing the repair cost alone of the three types of locomotives the combination will seem a little high, as it has no cable cost or reel maintenance. This is due to a rather delicate equipment originally installed in eight of these locomotives. This equipment was taken out about eight months ago and replaced with a later

and more rugged type, which has already lowered the maintenance from 2.51c. per ton to 2.11c. over the whole time period of 27 months.

Figured on the last eight months alone it is down to 1.42c. per ton. This is one pronounced advantage that the cable-reel locomotive has had over the combination machine in this comparison. Had the combination had this latter equipment in the beginning the difference would have been 0.69c. per ton more in its favor. Having been in service for many years, the design of cable-reel locomotives has reached a comparatively high state of perfection. This has been greatly in their favor wherever they have been called on to compete with storage-battery locomotives.

The cost of motor cable is used as a common argument by battery-locomotive "boosters" as an item sufficient to just about offset battery depreciation. This we do not believe can be verified except possibly in a few extreme cases. The average life of a cable on the locomotives for which results have just been given is eight months. Worked out in cost per ton it stands at about 0.3c. compared to battery depreciation of 2.92c. and 3.11c. per ton.

Battery Locomotive Has Low Repair Cost

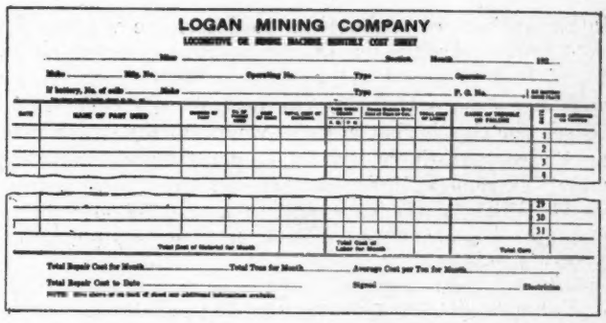
The straight storage-battery locomotive has a clear advantage over both the other types in maintenance cost, and it is not likely that either of them will ever be able to compete with it in this particular. Its entire electrical circuit is insulated from the ground. There is thus no difference in potential between the motor windings and frame, and for this reason the tendency to ground is eliminated, for the insulation must break down on both sides of the circuit before a short-circuit can exist.

Moreover, as the straight storage-battery locomotive has its whole source of power on its back and is not subject to transmission troubles or losses, the electrical equipment is designed for a much lower voltage than the combination or reel type. This, in addition to the double insulating feature, almost entirely eliminates electrical trouble. Records show that the number of such troubles with this kind of locomotive compared with that of the other types is about in the ratio of 1 to 12.

This brings in another important point of merit for which for want of more definite data this locomotive receives no credit in the tabulation. Had we had a record of the actual working time that these other locomotives lost by reason of their various electrical troubles we could have worked out fairly closely the additional cost incurred by them. The magnitude of these seemingly little disadvantages surprises us when we dig into them.

What does it mean to have a locomotive in the middle of the shift come hauling in another that is incapacitated from a burnout? It means that one locomotive is taken from its work for at least 15 or 20 minutes while the cost on that section goes right on. The other machine is out probably for the rest of the day; the miners on its section go home; the day is finished with 50 or 100 tons of coal short, yet with no curtailment of the day's expense. Do we notice these things? They certainly take place around all coal mines utilizing electrical haulage. These are the things that really count when it comes to considering the relative merits of various types of equipment.

The lower voltage of the straight storage-battery


LOGAN MINING COMPANY

machine gives it another advantage over the combination type from the battery point of view. The first cost of the battery is less per kilowatt-hour of capacity, because of the smaller number and the larger size of the cells. This reduced number of cells and lower voltage reduce the battery maintenance cost, there being fewer cells to keep up and less tendency for grounds and leakage due to lower voltage and a completely insulated battery circuit. From this company's records this consideration seems to have netted 12½ per cent longer life on this battery. Of course this is all worked into the data given and it also is noticeable to the extent of 0.19c. per ton on the battery depreciation, notwithstanding the fact that the combination locomotives did 20 per cent of their work from the trolley.

Another misfortune that to some extent has held down the tonnage of the straight battery machine is that it did not have sufficient battery capacity to even get a chance in competing with the combination locomotive for the larger producing territories. Consequently it has been forced to take the odds and ends of territories, in some of which enough miners could not be placed for the battery locomotive to make use of what capacity it had.

Delays Kill Chances of Reel Locomotive

It seems that the greatest disadvantage of the reel type of locomotive lies in its inability to compete with the battery machine in tonnage under average gathering conditions. This is due to a number of considerations, the majority of which probably have already been pointed out in this report and entered as dollars and cents in the comparison. They may be summed up, however, in three primary causes, some of which are made up of many details. They comprise power interruptions or failures from various causes, cable and reel troubles, inconveniences of changing from trolley to cable, and vice versa. These all represent delays, and the more concentrated the work and ideal the conditions for battery operation the more these delays are multiplied and the greater is the difference in favor of the storage battery.

In considering efficiency from a power standpoint it is generally thought that the cable-reel locomotive is more efficient than the battery. We do not believe there is much difference in the controllers of the two types of machine as the loss in a battery usually just about equals the line drop sustained in the other type. But from the controller to the rails sufficient reason exists to believe that the battery considerably leads the other type. In the first place the reel type almost always has a higher mileage rating, which tends to give quicker acceleration but which also results in considerably more slippage, thereby consuming energy uselessly.

From an investigation covering several days spent

in riding battery locomotives to determine whether or not they could make use of any additional speed it was found that they did not operate with their controller wide open more than 10 per cent of the time. The reason for this is that a series-wound motor which may have a comparatively low full-load rating will move off under extremely light load at several times normal speed, which is the case with a gathering locomotive picking up one and two cars at a time under average gathering conditions.

Careless Battery Motorman Goes Home Early

This being true, then the reel type with a higher mileage rating must necessarily under the same conditions operate with more resistance in the circuit than the battery machine. Another argument in the same direction is that in almost every case where the operator is changed from a reel-type to a battery locomotive, he "kills" the battery on much less tonnage than the old operator who has learned to save through a realization that his supply of energy is limited. There is no question but what a battery teaches economy in this respect. We believe that if an accurate test were made regarding this saving it would show that the storage-battery locomotive is about 40 per cent more efficient from a power standpoint than the cable-reel type.

So far in this discussion we have found no economical place for the cable-reel or combination locomotive; the straight battery machine has had the best of them on every hand. We have considered, however, only one condition, or what we have called normal or average, with a grade range of not over 4 per cent and that only locally. This leaves, however, quite a field to be covered by the other two types, with which the straight battery machine is almost sure never to interfere, for its usefulness is certainly limited to moderate grades and concentrated work. Even if the question of weight did not enter and it was practical to get a battery with sufficient capacity on a locomotive for such work the heavy battery depreciation would prohibit its use.

Cable-Reel Locomotive for Steep Grades

The combination locomotive is a cross, or compromise, between the straight battery and the cable-reel machine, embodying some of the advantages of both. The place for the cable-reel type is down over the hill, the combination just over the brink a little and the straight battery on top of the hill. If they will stay in their respective places there should be no trouble or argument, but if the battery goes down over the mountain it can expect to be run out by the cable-reel locomotive, or if the cable-reel persists in coming up or staying on the level it will be put out of business by the battery machine. In like manner the combination must not go too far over the hill or try to cover too much of the top. This designates an economical place for each of the above types of gathering locomotives, and it is doubtful whether there is a single large mine in the country that should not have just such a mixture of equipment if economy is its slogan.

The Logan Mining Co. was among the first in the country to install storage-battery locomotives. It started in when their use in coal mines was an experiment and made the mistake that nearly everyone else made in its first installation. It accepted batteries too small for the work. This no doubt has caused more failures and held back the use of storage-battery locomotives more than any other one consideration. The locomotive manufacturers, it seemed, were slow to design their machines so as to accomodate batteries of sufficient capacity.

The Logan Mining Co. is still confronted with some of this trouble, as it is now trying to install 25-plate batteries on locomotives originally designed for accumulators of 17 and 19 plates. The last five locomotives purchased are 48-cell 25-plate machines, and it is desired to replace all of the 48-cell batteries with 25-plate accumulators, and those with 88 cells with 15-plate batteries as fast as renewals are made. This is about what experience has taught is necessary under existing conditions.

From the above paragraph as well as in view of considerations mentioned elsewhere in this report it will be noted that practically all the batteries that have entered into this comparison have been at a disadvantage because of undercapacity. There probably is nothing so detrimental to the life of a lead battery as excessive overdischarge, yet this has been unavoidable with the above batteries. The only reliable safeguard against this contingency is plenty of capacity. Because of this difficulty and improper charging facilities this company realizes that it has not been able to exercise the proper care in the handling and operation of its batteries, but despite the short life that this lack of capacity has caused it knows that it has saved money. It is now making arrangements to install the modified constant-potential charging system, and as it is also installing larger batteries it expects much better results in the future than have been shown here.

In conclusion it should be reiterated that there is an economical place or condition in almost every coal mine for each type of locomotive, the relative merits of which have been here considered. The field is large and the conditions many; therefore, only a question of the right application remains.

An urgent request is made that electrical and mechanical men connected with coal mining adopt some system of cost accounting and record keeping as to the performance of the locomotives under their charge, to the end that their companies may be profited, they themselves may become better posted and the inquirer be able to obtain more reliable information whereon to base conclusions.

An example of the effect on the cost of production of such record keeping over a period of 27 months divided into three periods of 12, 8 and 7 months is presented in Table V. The figures include total maintenance and battery depreciation on all the locomotives that the Logan Mining Co. possesses. Some of these results were not considered in making the comparisons here set forth because of the comparatively short time during which they had been in service.

TABLE V—SHOWING HOW MAINTENANCE AND BATTERY DEPRECIATION COSTS DECLINED

	Tons Moved	Cost	Cost per Ton Cents
First 12 months	505,300	$29,435.33	5.83
Next 8 months	476,810	17,610.06	3.69
Next 7 months	417,963	8,745.88	2.09
27 months	1,400,073	$55,791,27	3.98

Note the uniform reduction after the first twelve months. It may be correctly assumed that had it not been for the record keeping the cost would have continued somewhere near that of the first year, and if so the total outlay on the above tonnage would have been $81,624.26 instead of $55,791.27. This shows a net saving of $25,832.99, or approximately $1,000 per month. If the cost is held down to 2.09c. per ton the

saving on the next 1,400,073 tons will be $52,362.73, or approximately $2,000 per month at the assumed rate of production. About 25 per cent of this reduction in cost was affected by the introduction some time ago of a combined daily and monthly detailed battery report, the use of which has already netted this company a 32-per cent increase in battery life.

This company was not behind its neighbors in efficiency when it began this record keeping. In fact it has always been considered an efficient and progressive coal producer by those engaged in similar business. The question will naturally arise as to how such a system of reports could be effective in reducing cost. First, it points out the sum which it is actually costing to maintain the operation of certain equipment; second, it provides a means whereby the many details of maintenance may be studied. By such study and familiarity certain items of cost may often be reduced and sometimes entirely eliminated by removal of the cause.

Causes, and not symptoms, must be treated if worthwhile results are to be obtained. That which interrupts the service of a piece of equipment one day will do it again under like conditions tomorrow. A record of the past is an index to the future. But for history we would be groping in the dark. A specialist can watch symptoms, prescribe treatment and effect a cure for many ills through the reports of a good nurse.

Alternating-Current Motors with Unusual Range in Running Speed

MULTI-SPEED alternating-current motors capable of being run at 600, 720, 900 and 1,200 r.p.m., thus having a range closely approaching that formerly attained only with direct-current motors, are now being constructed to meet the demands of industry. These motors are made of many sizes.

Until recently the standard four-speed windings of alternating-current motors afforded speeds of 600, 900, 1,200 and 1,800 r.p.m., the latter two speeds being twice the two former. Introduction of the new speed of 720 r.p.m constitutes an important improvement in design and gives this motor a marked advantage over its predecessors. The speed increments of 20, 25 and 33⅓ per cent as contrasted with those of 50, 33⅓ and 50 per cent, the former range in such machines, makes it possible to obtain almost as accurate an adjustment of motor speed to required machine speed as has in the past been obtainable only with direct-current motors.

These new units are known as Watson multi-speed motors and are manufactured by the Mechanical Appliance Co., of Milwaukee, Wis. They are all rated on the 40-deg. basis, that is, they will carry full rated load indefinitely without exceeding a 40-deg. rise in temperature. A 25-per cent overload may be carried for two hours with a temperature rise not exceeding 55 deg. C.

Motors can be supplied to furnish either constant horsepower or constant torque or any combination of horsepower and torque in two, three or four speeds on 60-cycle current. The same ratings can be furnished for other frequencies and in either two- or three-phase.

Suitable control apparatus for these motors has been developed and tried out so that these machines may be operated on either automatic or remote control. Adequate protective apparatus has also been developed for use with this equipment.

It will be evident that effective individual alternating-current drive is now available for many types of machines that heretofore have been actuated by direct-current motors only. Machine tools, conveyors, fans and the like can be operated at a variety of speeds without loss of efficiency, while such machines as air and ammonia compressors may be run at only a slight deviation from the exact speed required.

Dr. Finegan Praises Educational Work Of Nanticoke Mining Institute

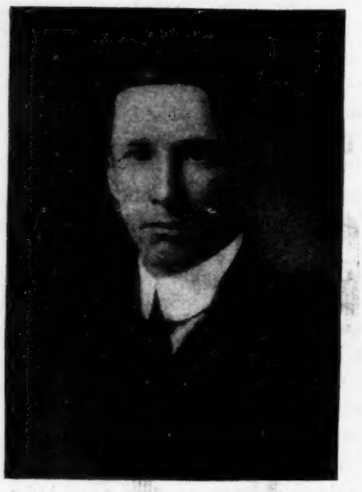
"THE finest instance of co-operation between industry and public education in providing right training for the men who work," is the way Dr. Thomas E. Finegan, superintendent of the state school system of Pennsylvania, describes a conference initiated by the Nanticoke Mining Institute. The institute is composed of mine owners, mine operators and mine workers. Dr. Finegan's remarks were part of a statement issued at the Department of Public Instruction, at Harrisburg.

"At the suggestion of the officers of this institution," he said, "the Department of Public Instruction called a conference of representatives of the institute, the Pennsylvania State College and the Nanticoke public schools to determine the kinds of industrial courses needed in the Nanticoke region for the training of mine workers and to lay plans for the development of these courses.

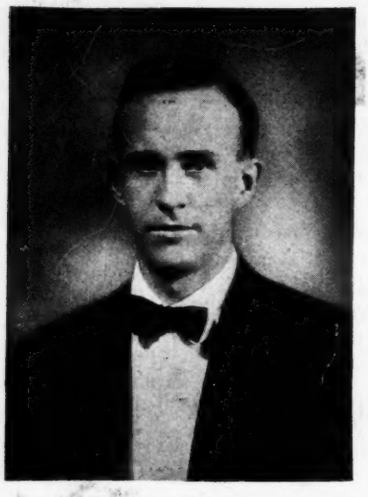
"In planning courses for the men who work at the occupation of mining the thing that was uppermost in the minds of the conference group was the welfare of the workers. After careful deliberation it was agreed that there were three courses that would be most helpful to the men who worked at the mining industry: A course for the preparation of mine foremen, a course in mining machinery and a course in mine electrical machinery. The major objective of each of these courses is to increase the occupational intelligence of the men who are engaged in work in and around the mine, to make them skillful in their different trades and occupations, and, in so far as possible, to prepare them for advancement.

"In addition to the technical information to be given in connection with each course each individual is given some instruction in first-aid treatment, and all persons who work underground are given a certain amount of instruction in methods of preventing explosions, in general principles of mine ventilation, in air currents and such other information as will make mining a safer and thus a happier occupation. More than this, each individual is given certain elementary instruction about the formation of coal and the classification and characteristics of coal, in order that they may more fully appreciate the industry with which they are closely associated. Workers in industry must have something more than skill if they are to live more completely and give to the world their best efforts. They must be contented, they must be happy, and they must have a pride in their work if industry is to get the best results from the energy that goes into it.

"The Department of Public Instruction is co-operating with industry and with local school districts in the establishment of such industrial courses as will increase the intelligence, broaden the horizon and add to the happiness of the men and women who work. Public education is deeply interested in the education and welfare of the unskilled workman and his family, of the skilled workman and his family and of the professionally trained person and his family. And this interest is not peculiar to the public schools. One of the most wholesome signs of progress today is the interest exhibited by industry in the training and welfare of its workers. It has not been many years since employers of industry paid little or no attention to the education and training of the workers in unskilled occupations, and little enough attention to the training of skilled workers. The attitude today is wholly different."



M. A. WHITING
Paper "Automatic Electric Apparatus



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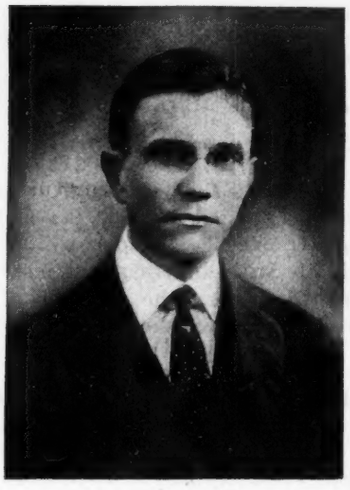
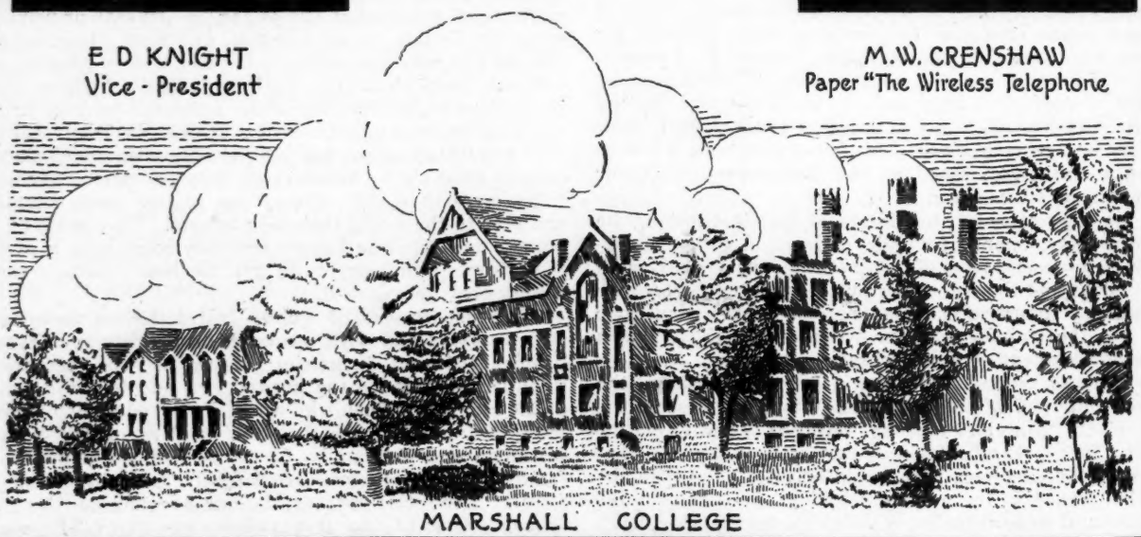


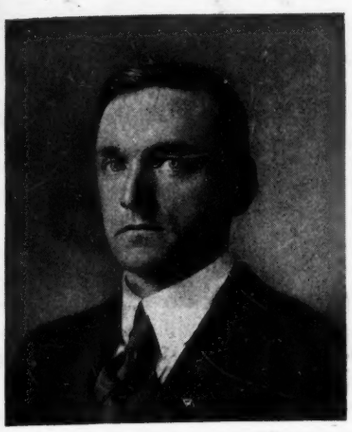
M. W. CRENSHAW
Paper "The Wireless Telephone



MARSHALL COLLEGE

OFFICIALS OF WEST VIRGINIA-KENTUCKY ASSOCIATION OF MINE, MECHANICAL AND ELECTRICAL ENGINEERS

In the upper left corner and lower right corner are two authors of papers which are to be presented at the coming sessions. Marshall College, which decorates the lower edge of the page, is one of the older institutions of the convention city, a state college with 600 students and 42 teachers. This shows only the parent building. To it has recently been added a science hall and a gymnasium.



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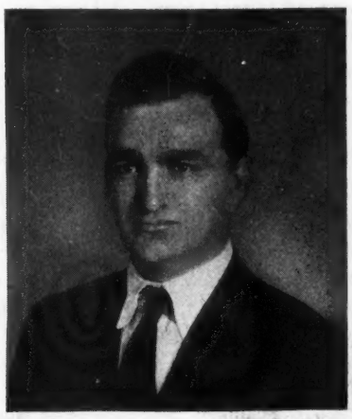
Weeksbury, Ky.



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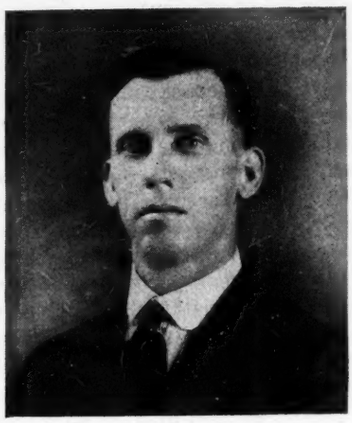
Bluefield, W. Va.

C. J. FUETTER
Van Lear, Ky.

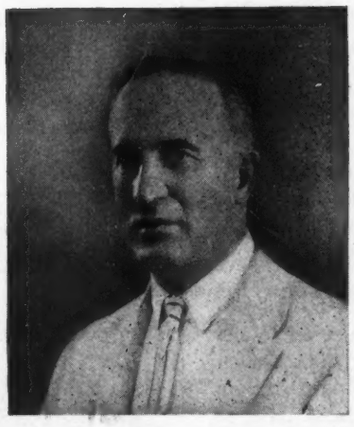


C. E. ROGERS
Logan, W. Va

J. J. FLUCK
Huntington, W. Va.

ROSCOE WOLTZ
Big Stone Gap, Va

COUNTY COURT HOUSE



M. A. MAXWELL
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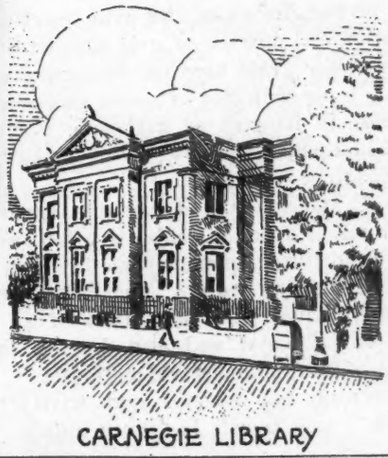


CARNEGIE LIBRARY

CHAIRMEN OF COMMITTEES WHO WILL REPORT AT THE HUNTINGTON SESSION OF THE ASSOCIATION, SEPT. 19-22

R. R. Webster is chairman of committee on insulating oils; F. M. Reigher, of committee on cable insulation; C. J. Fuetter, of committee on underground transmission and distribution; C. E. Rogers, of committee on relative merits of gathering locomotives; J. J. Fluck, of committee on mine locomotive wheels and tires; Roscoe Woltz, of committee on resistance grids; M. A. Maxwell, of committee on power costs.

Relative Value of Cast Grids and Grids of Steel Plate For Use as Resistors in Mine Locomotives*

Cast Grids Do Not Warp as Much as Plate Grids—They Rust Less and Are More Rigid and Require Fewer Tie Rods—Punched Sheet-Metal Grids Resist Shocks Well

RESISTOR grids are used on mine locomotives mainly for the purpose of protecting motors and controlling their speed when they are connected across the source of supply, whether that source be a battery or a trolley system. Much effort has been made to eliminate resistor grids, but alternative devices are either excessive in first cost or too bulky and too much attention may be needed to keep them in order. In fact practically all the devices designed for this purpose have all three of these objections, particularly for equipment like the mine locomotive. Needless to say, resistor grids have been the subject of much study, the object being to provide units having the following characteristics:

(1) Small change in resistance for any given change in temperature, (2) greater thermal capacity, (3) minimum warping, (4) greater rigidity, (5) non-rusting qualities, (6) fewer tie rods, (7) fewer contacts between grids when assembled, (8) lower first cost and (9) lower expenditures for maintenance.

Cast Grids Fill Specifications Closest

As a whole cast grids fill the above requirements much more satisfactorily than any other type of grid so far developed, particularly in mine service. Grids of smaller cross-section which have lower capacity and a higher resistance per unit do not, as a rule, give the satisfaction that is obtained with grids of larger cross-section and lower resistance per unit. The electrical characteristics are the same regardless of the difference in cross-section, but grids of small cross-section usually are mechanically weaker than those with large cross-section.

This, of course, might be expected. It is, however, possible to overcome this difficulty to a great extent by the proper design of the grid convolutions and by the location and number of grid supports.

The resistor grids used on stationary apparatus are less likely to be subjected to severe shocks and vibrations than those in haulage or gathering locomotives or in portable equipment such as is used for battery charging or arc welding.

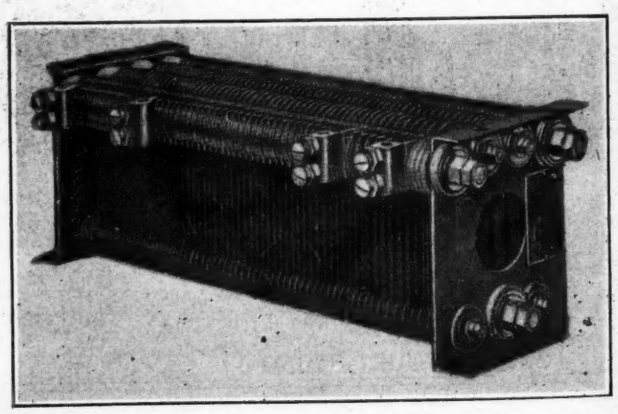
In both stationary and portable apparatus, particularly in mines, resistor grids are often subjected to the effects of moisture and often come in direct contact with sprayed or flowing water. The latter, being more or less contaminated with impurities of an acid nature, readily attack metal and also destroy the insulating qualities of various dielectric materials.

Theoretically cast resistor grids have a hard surface, which, as is well known, has much higher rust-resisting qualities than the surface of steel plates or punched grids. As a result cast grids corrode less than those of punched sheet steel. Much research, however, has been made into the possibility of combining this rust-resisting with the qualities that are required of a resistor grid.

Resistor units traversed by high currents are subjected to widely varying temperatures. The electrical resistance of any of the metals will be altered with a change in temperature, each material having its own temperature coefficient of resistance. Metal of the nature used in grids of the cast-iron or cast-alloy type, as well as sheet metal used for punched metal grids, has an increasing resistance with increasing temperatures—that is, a positive temperature coefficient of resistance. Different metals, whether cast or in sheets, have different values for this coefficient.

The resistor grids for mine locomotives should be made of metal having a low temperature coefficient of resistance. Much effort has been expended to develop such a metal, consideration being given, of course, to the possibility of manufacturing the material so that the results always will be consistent. Cast-iron grids and cast-alloy grids when manufactured in large quantities and by men experienced in the casting and running of the heat can be produced with consistent results as to weight per unit, resistance per unit, thermal capacity and temperature coefficient of resistance. Reliable manufacturers make it a practice to have each grid unit tested, and they require that it shall come within fixed limits as to the above characteristics.

Owing to their lower cost cast-grid products have been more generally used than grids of any other type so far developed. To give a product with electrical characteristics equal to those of the cast grids it is necessary to use a special alloy steel. Grids punched from sheet metal have mechanical characteristics of some merit, the principal one being their ability to



RESISTANCE GRID MADE OF PUNCHED STEEL PLATES

This is a Post-Glover grid of the type to which reference is made near the close of this article. Some prefer the punched steel plates wherever the grid is exposed to repeated shocks, as in locomotive service.

*Report made by the committee on "The Use, in Mine Locomotives, of Resistance Grids Made of Rolled-Steel Plate as Compared with Cast Grids." This report was presented at the Huntington convention of the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, Sept. 19 to 22. The committee consists of Roscoe Woltz (chairman), George Suiter, A. Fred Phelps, J. B. Penman and G. E. Lowther.

COMPARISON OF RESISTANCES USED ON 10-TON, 250-VOLT MINE LOCOMOTIVE

	Post-Glover "Everlasting" Steel Resistance								Original Cast-Iron Resistance					
	Set in Use At No. 1 Division		Set in Use At No. 1 Division		Set Before Put Into Use At No. 2 Division		Set Before Put Into Use At No. 2 Division		Set In Use At No. 1 Division		Set In Use At No. 2 Division		Goodman Co.'s Standard	
	Ohms	Per Cent	Ohms	Per Cent	Ohms	Per Cent	Ohms	Per Cent	Ohms	Per Cent	Ohms	Per Cent	Ohms	Per Cent
R1-R2	1.32	63.0	1.420	73	1.18	73.0	1.15	72.0	0.84	43	0.58	25.0	0.700	46
R2-R3	0.36	17.0	0.250	13	0.24	15.0	0.21	13.0	0.57	29	0.285	12.5	0.420	28
R3-R4	0.32	15.2	0.180	9	0.15	9.0	0.17	10.0	0.27	14	0.83	37.0	0.186	12
R4-R5	0.077	3.7	0.078	4	0.03	1.8	0.05	3.2	0.155	8	3.44	15.5	0.140	9
R5-R6	0.023	1.1	0.019	1	0.018	1.2	0.028	1.8	0.116	6	0.222	10.0	0.070	5
Total	2.09	100.0	1.93	100	1.618	100.0	1.608	100.0	1.94	100	2.261	100.0	1.516	100

withstand more severe shocks than cast grids, particularly those of the smaller cross-section, but cast-iron grids of the larger section are seldom affected by the most severe shock found in locomotive service. Cast-alloy grids are tougher than cast-iron grids and, therefore, small grids of cast alloy can be used in more severe service than similar cast-iron grids.

When overloaded both cast- and punched-steel grids are susceptible to overheating. When, however, the overloading is of but short duration the grids are in no way injured, but if the overload lasts for a long time it will burn out the resistor. In locomotive service the frequency and duration of overloads depend on the care of the motormen; especially is the overload unduly prolonged when the locomotive is allowed to run for a long time with the controller in the resistor notches.

Grids Warp When Severely Overheated

The units of punched-metal grids are less rigid than those of cast grids and more supports for the grids are, therefore, necessary. It has been found that when these grids are heated to high temperatures such as are common in resistors used in locomotive service, the grids warp excessively. Cast grids also will warp, but not as much as those that are made of punched metal. When the grids warp, adjacent elements come in contact and are short-circuited. This imposes on the other grids a heavier load, and once the warping starts and causes contact with other grids, it is likely that this will continue to a further destruction of the grid units if attention be not given to remove the faulty grids first found to be warping.

In the assembly of grids, particularly of the type from punched metal, care must be taken to have sufficient spacing between the grid units. The reason for this is two-fold:

First, on account of the rapid corrosion, for rust particles soon make a contact between the grids if the spacing is small. This usually causes pitting and ultimately has the same effect as a warping of the grids. It causes short-circuiting of a part of the resistance till finally all the resistors become short-circuited. These difficulties are largely the outcome of faulty design and to a great extent may be prevented by a wider spacing of the grids and by the proper arrangement of the insulation between them.

Second, adequate spacing is necessary because of the heat from the assembled units, which must be effectively dissipated or it will become too intense. If sufficient spacing is not used between the grids hot spots are likely to be found in the grid assembly; these usually will be at the center of the grids and at the center of the grid assembly.

In connection with my attempt to get some tangible comparison between the two types of grids I have had a number of reports that the steel-plate grid gave better service than the cast grid which it replaced, but these reports do not mean much unless we know the characteristics of the cast grid that was removed and also know that the cast grid, of whatever type it may have been, was in good condition, the points properly proportioned, etc.

For instance, in my experience, trouble with the resistance on several occasions has been reported, especially on gathering locomotives where it is necessary to run on points a considerable length of time. In a number of instances I found the resistors were not properly assembled and the terminals not properly spaced, and in other cases I have found that an inefficient type of grid had been installed.

I have had occasion recently to inspect two main-line haulage locomotives at one operation and a gathering locomotive at another. These have been equipped with steel-grid resistors for a number of years, and I found them to be in unusually good condition, and yet the maintenance cost had been negligible. The gathering locomotive, however, accelerated somewhat too quickly. This probably was due to a lack of space for mounting a sufficient number of the steel grids.

Experience with Two Types of Grids

Below is a report from an engineer of one of the larger coal companies, giving the experience of that corporation with the steel-grid resistor:

"To date we have used the steel grids only on 10-ton haulage locomotives. A trial of the steel grids was prompted by excessive trouble due to breaking of the standard cast grid which was supplied with this locomotive. On long, heavy hauls it sometimes happened that the locomotive would get a severe jolt when the grids were red hot and almost a whole set would go to pieces at once.

"In 1919 we allowed the Post-Glover Electric Co. to send us a set for one locomotive, this set consisting of three stacks of a specification which they recommended for the purpose. The cost of the set was approximately $290. After using it for one year without trouble we decided to replace cast-iron with steel-grid resistances on nine of these 10-ton locomotives at our various properties. As the first set was still giving apparent satisfaction we again allowed the Post-Glover Co. to furnish the type which they recommended for the service. At this time the steel sets cost $300 against $150 for the cast-iron sets.

"Soon after the installation of this second order we had many complaints to the effect that the locomotives did not accelerate uniformly on the controller notches. We then made tests to find the actual resistance between controller points. Attached is a copy of a few of these tests. You will note that the steel resistance was not properly proportioned; for instance, R1 to R2 contained 63 per cent and R5 to R6 only about 1 per cent of the

total resistance. The first set which was tried gave apparent satisfaction because the locomotive in which it was placed had been used on a voltage so low that this lack of proper proportion was never noticeable. Our experience with these steel resistances has been somewhat varied. In three or four cases we have had a complete stack or complete set practically ruined in a short time. In most instances we were unable to determine what was the real cause, and to date we have never been able to repair satisfactorily one of these steel resistance stacks. In spite of all the troubles we have had, we consider that it pays to use steel resistances, and in January, of this year, ordered another set. However, this time we asked the manufacturer to build it to our specifications as follows:

"One set 'Everlasting' steel resistance for use on 10-ton 250-volt mine locomotive. Total resistance to be 1.75 ohms (manufacturer may recommend and furnish grids of different resistance if he does not vary more than 10 per cent above or below this quantity). Resistance to be proportioned so that R1-R2 contains 48 per cent; R2-R3, 28 per cent; R3-R4, 12 per cent; R4-R5, 9 per cent, and R5-R6, 5 per cent of total resistance. Below is the result of a test on the grids received.

"Total resistance, 1.753 ohms; R1-R2, 0.753 ohms, equal to 47.8 per cent; R2-R3, 0.412 ohms, equal to 26.2 per cent; R3-R4, 0.190 ohms, equal to 12 per cent; R4-R5, 0.143 ohms, equal to 9.1 per cent; R5-R6, 0.075 ohms, equal to 4.79 per cent.

"You will note that this last set had the total resistance better distributed between points. Apparently the people building these grids have made a radical change for the better in their design and engineering. This last set of resistance contains grids of the same thickness throughout instead of a number of varied thicknesses, as in their older type. Also this latest resistance is built with larger spaces between adjacent grids, so that buckling will not so easily cause shorts.

"So far we have not considered the use of the steel grid on any of our gathering locomotives, mining machines, etc. However, in the light of the much improved type which we last received, it appears that the steel resistance has a great advantage in severe service.

"In this connection we wish to call your attention to the fact that the manufacturers of the locomotive have recently developed what they assert is a much improved type of cast resistance for these 10-ton type locomotives. Instead of being in three stacks their new resistance is all in one stack, and the grids are of a much heavier section. They offer complete sets of this new-type cast-iron resistance for $140."

In general, summing up the relative merits of cast-iron, cast-alloy and punched-metal grids, it can be stated that the cast-iron grids will, for stationary apparatus, be the cheapest from the standpoint of first cost, maintenance and consistent electrical characteristics. For portable equipment the cast-alloy grids will have a slightly higher first cost, have approximately the same electrical characteristics as cast-iron grids, but the alloy will give the desired toughness. At a considerably greater first cost the punched-metal grids will give practically an unbreakable resistor element. In obtaining this quality some of the better electrical characteristics found or obtained in cast grids are sacrificed, namely low temperature coefficient of resistance, thermal capacity, few tie rods or grid supports and ease in making repairs.

Low-Roof Trolley Ear Carries Any Kind of Wire That at Any Time May Be Desired

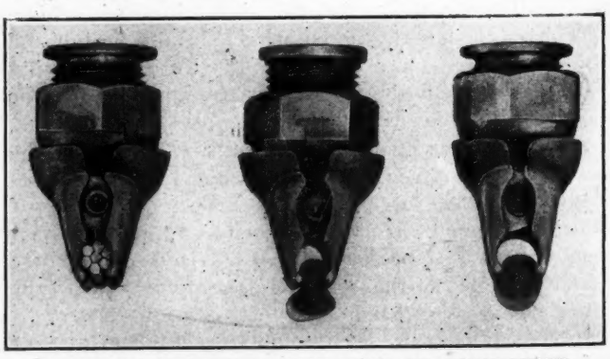
A NEW highly compact trolley ear for mine service is so constructed that not only grooved or figure 8 trolley wire, but also round feeder wire in sizes up to 0000 can be strung from it. When desired, this latter may be replaced with trolley wire, using the same ears.

Chief among its advantages are its simplicity, holding power and the high headroom that it affords. It consists of two parts: the stud and the wings, or jaws, that grip the wire. The stud is threaded both inside and out; inside for screwing into the suspension, and outside for the clamping nut that forces the jaws together. The lower end of the stud terminates in a button around which the jaws are clamped. In installing all that is necessary is to screw the stud on the suspension, insert the trolley or feeder wire between the jaws, and screw down the holding nut.

Tests have been made on the holding power of this ear. These show that in all cases where grooved or figure 8 wire was under test for pull-down strength a section of the wire sheared off before the ear was damaged or let go. The average downward pull for four such tests, using different sizes of wire, was about 2,600 lb. With round wire (00) the pull needed to remove it from the ear was 2,100 lb. When tests were made for side-pull strength an average pull of about 1,950 lb. had to be exerted with grooved or figure 8 wire before the ear let go. In side pull with round wire the ear relinquished its hold only when a tension of 2,350 lb. was reached.

In addition to those just mentioned this ear possesses other advantages, both mechanical and electrical. Being only 2½ in. in height over all, it allows plenty of headroom, which is an important consideration in low roadways. The jaws are so shaped that they offer no obstruction to the passage of the trolley wheel, thus eliminating arcing, which always is dangerous. As this support can be used equally well with both grooved and figure 8 wire, a double stock of ears need not be carried in mines where both sections of wire are used.

This ear, known as the form W, has been developed by the General Electric Co. As it will hold round or cable wire up to 0000 it can be used to support the temporary feeder wire by which current is supplied, in developing entries, and for the operation of pumps, drills and cutting machines. Later, if it is decided to operate locomotives in these headings, the temporary feeder may be replaced with trolley wire, and the same ears will be found equally suitable.



TROLLEY EAR HOLDS ANY KIND OF CONDUCTOR

The trolley ear that at the beginning of development carried a light feeder cable later may be found supporting a trolley wire of grooved or figure 8 section.

Safety Council Debates Hazards to Health and Limb—I

Sanitation in Mines—Septic Tanks—Water Supply—Carbon Dioxide Added to Oxygen in Resuscitation—Better Accident Records—Pressure of Water and Diameter of Hose in Fire Fighting—Standard Couplings

By R. Dawson Hall*

DESPITE the present uncertainty in industry the National Safety Council held a most successful convention in the Cass Technical High School, Detroit, Mich., Aug. 28 to Sept. 1. Even in the mining section little or no falling off was to be noted in the attendance and certainly none in the number and quality of the papers presented. About 2,500 persons registered. As usual the registration represented inadequately the number of persons present, for Detroit being a big manufacturing center many people attended who were not members or delegates of the organization.

In the opening session on Monday in the auditorium of the magnificent but only partly completed wing of the technical school, a large number were present to hear the extremely hopeful and satisfactory reports of the president, A. H. Young, and the secretary-treasurer, W. E. Worth. No one can overlook the fact that the treasury was in grievous condition at the close of last year and during the early part of this. Stringent economy, clever financing and the recovery of business have, however, changed a heavy deficit to a small surplus. The decline in membership has been stopped, and since the date of the report—July 1—the memberships have been slowly but steadily increasing in number.

Council Has Quarter-Million Dollar Income

The loss in membership in the fiscal year ending July 1 was 566, making the membership 3,060. The gross revenue was $205,996.32. At the beginning of the fiscal year the notes payable were $21,968.80 and at the closing of the books these were entirely wiped out. The accounts payable had also been reduced from $6,222.48 to nothing, and $4,662.78 was added to the surplus, making that reserve $34,819.78.

The National Safety News brought in $20,386.24 and cost $24,220.40. It should be said that the former figure did not include any of the allocated dues from members of the Council, though it did cover a number of extra copies which are sold to members on their order. The 120,000 calendars distributed cost $16,490.10 and brought in $23,358.81, a profit of nearly $7,000.

On Monday evening a dance was held at the Statler Hotel, on Tuesday evening a smile party, on Wednesday evening a boat ride and on Thursday a banquet. At the function last mentioned the speakers were A. H. Young, the president of the Council; Marcus A. Dow, general safety agent of the New York Central Lines, and Edgar A. Guest, of the *Detroit Free Press*. The new officials of the National Safety Council were announced. These were M. A. Dow, president; Charles B. Auel, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., vice-president in charge of industrial safety matters; David Van Schaak, Ætna Life Insurance Co., New York City, vice-president in charge of public safety matters; George T. Fonda, Fonda & Tolstead, Washington, D. C., vice-president in charge of sectional activities; L. A. De Blois, Delaware Safety Council, Wilmington, Del., in charge of local councils; Homer Niez, Commonwealth Edison Co., treasurer and chairman of finance committee, and William H. Cameron, managing director and secretary.

During Thursday morning's session of the mining section the nominating committee, consisting of Dr. R. R. Sayers, J. W. Reed and J. T. Ryan, brought in a report advocating the retention of the present official roster: B. F. Tillson (chairman), G. M. Gillette, J. L. Boardman, William Conibear, vice presidents, and R. H. Seip, secretary. The report was unanimously adopted. These then will be the officials for the coming year. The chairman will appoint his own committeemen.

The mining section had its first session on Tuesday, Aug. 29, the first paper being that of Dr. R. R. Sayers on "Mine Sanitation." In the discussion B. F. Tillson inquired whether any mine had established underground a regular toilet installation with a flushing system and septic tank. Apparently no one was able to report that any company had to date such an installation.

M. S. Murray, of Curtisville, Pa., reported that his concern, the Ford Collieries Co., had installed a septic tank with three stools on the top of it. The tank was fed with some form of deodorizer and disinfectant which converted the fecal matter into a clear fluid which in turn passed to the sump and was of such a character that it did not foul the pumps as does the discharge of ordinary fecal matter not so treated. B. F. Tillson stated that at the New Jersey Zinc Co.'s mines cans were used and to prevent splashing sawdust was provided in place of water. These cans when brought to the surface were cleaned and disinfected by steam. Difficulty was experienced in incinerating the sawdust as it was so thoroughly saturated with water as to be dripping wet.

Caustic Soda Turns All to a Fluid Mass

Dr. Sayers declared that a 3-per cent solution of commercial caustic soda would thoroughly disinfect and deodorize sewage and liquefy paper of a suitable character. Unfortunately galvanizing will not resist the action of the solvent, but when the tank is properly covered with an asphalt paint and handled with a proper degree of care the caustic soda will not destroy or seriously injure it.

Dr. Black, of Connecticut, requested Dr. Sayers to state what showing of *bacillus coli* was considered evidence of contamination of drinking water and took exception to the moderation of advice that the watershed should be inspected before water from it was used. He said that the inspection should be repeated at frequent intervals to make sure that the watershed did not become polluted. Dr. Sayers said he did not regard the presence of a single bacillus in any one tube out of ten, each of 1 c.c. capacity, as evidence of a

*Engineering editor, *Coal Age*.

dangerous contamination because *bacillus coli* was found in all animal feces, and deer, rabbits and like animals might well be the source of such impurity, which was not in any way objectionable in itself. The objection to its presence was that where the *bacillus coli* was found the water must contain animal feces and at any time such feces might become harmful by the introduction of the germ of some communicable disease.

J. S. Boardman stated that the Anaconda Copper Mining Co. piped cold water to every level, the pressure being regulated by the use of tanks. The water is passed through pipes in each tank, ice being placed around the pipes. Miners obtained their water through a faucet. Most of the men bring the liquid containers of their dinner pails to the tank, but the use of the common drinking cup has not been entirely eliminated.

Leaving the main subject, someone asked Dr. Sayers whether the Bureau of Mines favored the use of 5 per cent of carbon dioxide in the oxygen used for resuscitation, and he replied that the Bureau had so far not given its approval. He added that oxygen, if taken pure, is a long time removing carbon monoxide from the system. With 5-per cent carbon dioxide present the work is performed in a fourth and with 8 to 10 per cent one-fifth or one-sixth of the time.

Helps Clean the Blood but May Harm the Heart

Dr. Yandell Henderson strongly favors the use of 5 per cent of the dioxide. Most of Dr. Sayers' experiments with animals had been made with 8 per cent and in some cases death resulted. The use of dioxide was injurious to the action of the heart, and if the heart was weak the effects might be undesirable—even fatal.

Dr. Henderson, however, believed that 5 per cent of dioxide would in no case kill the patient. Dr. Sayers was not yet sure and would feel better satisfied had he made experiments on animals with that percentage. With such an authority as Dr. Henderson in favor of the use of such a proportion of dioxide Dr. Sayers felt that it was in all probability safe, but only a medical man should use such an admixture, for the administrant should be able to judge of the effect which the dioxide was having on the heart.

Discussing his statement that in several Southern states hookworm had been found in the mines, he declared that the Public Health Service stood sponsor for that declaration and felt confident that the mines were the source of the particular infection that they discovered and not the surface. He also believed nystagmus to be a disease resulting from the effect of working in bad light or light falling at an improper angle, or both, for men had been afflicted by nystagmus who had never worked in the mines. He hardly credited the notion that it was a germ disease, though the theory had advocates. It may be said in passing that some believe that changes in blood pressure due to depth may be the cause of the disease, which is of quite frequent occurrence abroad. This is about to be investigated by the U. S. Bureau of Mines.

W. W. Adams, statistician of the Bureau, introduced several forms of accident reports and occupational censuses for such members of the National Safety Council as desired to use them in making returns to the Bureau. These were prepared with the aid of C. L. Colburn. Their purpose is to discover not only the number and kind of accidents, fatal and non-fatal, and their minute causes but also the occupational hazard for each type of work in the mine. The definition of an accident is a casualty that causes a disability extending beyond the shift in which the accident occurred.

This goes far beyond the general practice today, which is to pay attention in most cases only to fatal accidents or to such as are of compensable severity. Several members of the National Safety Council want for their own use figures which will give this information relative to their own mines. They want similar aggregate figures from the mines which already are preparing such data and they want to formulate a practice in reporting accidents in all such mines as will make the figures from them comparable. No one, of course, need give such information, and when the bureau gets it it will use it solely for tabulations which will not reveal the figures of any one company or the name of that company. The data of any one corporation or any one mine will, however, be furnished to the company headquarters of the mine reporting.

Many changes were made in the original draft, the whole matter being discussed at length at the first session and at a special meeting in the afternoon of Wednesday. That meeting lasted three or four hours, and the blanks will be corrected by Mr. Adams to accord with the outline then agreed upon. Simplification, uniformity between coal-mine and metal-mine reports, elimination of questions which it was thought could not be answered from facts already being collected and the deletion of questions that could only bring forth matters of opinion were the directions in which most of the changes were made.

The second meeting, that of Wednesday, Aug. 30, was addressed by R. H. Seip, safety engineer of the New Jersey Zinc Co., of Franklin, N. J., the subject being "Mine-Fire Prevention and Fighting."

In discussing this subject B. F. Tillson desired to know what size of stream should be used in fighting fires underground. He himself believed in high pressures and small nozzles. The pressure available usually was high—too high if anything. Consequently no great harm would result from the loss of pressure consequent upon the friction encountered when passing water through a small hose. It was important to use a high-pressure, for the nozzle could rarely be advanced near the fire and the water would have to be allowed to travel in a nearly horizontal stream. In outdoor fires the nozzle could be directed several degrees above the horizontal and could often be held at no great distance from the fire which was being fought.

Uncertainty as to "Standard Couplings"

William Conibear said that the Bureau of Mines had investigated this matter and favored 50-lb. pressure and a 2½-in. hose. To Mr. Tillson that seemed too low a pressure and too large a diameter. The smaller hose would give greater portability. J. L. Boardman said that he had been told that he should use "standard pipe couplings," so that he could connect up with the Butte fire department's equipment. He took the advice, ordered "standard couplings," only to find that the standards varied and that the Butte fire department couplings have one half thread, more or less, to the inch than the "standard" couplings of the hose furnished to the Anaconda Copper Mining Co. However, as one member pointed out, the use of one coupling of the standard of the local fire department would make it possible to connect the company's line of hose with that of the city.

(To Be Continued in the Next Issue)

Problems of Operating Men

Edited by James T. Beard

Causes of Burned-Out Mine-Motor Armatures

Poor Bonding of Rails—Bad Joints in Feedwire Conductors Cause Large Loss of Voltage—Insufficient Copper or Too Small Area of Feedwire

IN MY experience, there are just two main causes that lead to the burning out of armatures on mine locomotives and other motors. As mentioned in the excellent article of F. C. Sinback, *Coal Age*, Mar. 23, p. 492, these causes are the poor bonding of rails and bad joints in the feedwire conductors; also, the use of undersized feedwires.

In this connection, I recall reading a well written article by B. F. Grimm, which appeared in *Coal Age* some time ago (Vol. 20, p. 291). If I remember rightly, Mr. Grimm emphasized the same points in speaking of the burning out of armatures.

It is surprising to know that 75 per cent of our mines are operating, today, under these conditions. Owing to the desire to economize, or, in other words, to save copper, in making an electrical installation, it is a common occurrence to use a feedwire that is too small.

Where to Save Money in Making Electrical Installations

Comparatively few operators realize that by using more copper in making the installation, they will save money in the rewinding of armatures and cutting down of power bills, to say nothing of avoiding the consequent delay and loss in production that results from insufficient power.

Of somewhat less importance, because it can be easily remedied by going over the line, is the bad jointing of feedwire conductors. Many do not appreciate the loss of voltage due to bad joints in the feedwires. This trouble is at once shown by the joint becoming hot when the feeder is carrying a load and often the insulation is burned and fire may result.

When making a joint, the wires should first be wrapped tightly around each other and soldered. If this is done properly, a joint will have twice the current capacity of the wire, as it has twice the sectional area of the conductor.

Good Rail Bonds Needed

The bonding of the rails is not so easy and requires constant watchcare on the part of the electrician to keep the bonds in good condition. It is not generally known that a loose or a broken bond will cause a loss of from one to ten volts; and a few such defective bonds will greatly increase the linedrop and impair the service.

A little circulation will show that most mines have not sufficient copper in the feedwire installed. For example, in order to operate a 10-ton locomotive, at a distance of a mile from the powerhouse, assuming the perfect bonding of the rails and allowing a 10 per cent linedrop, with a pressure at the generator of 250 volts, there will be required a 0000-trolley wire and a feedwire of, say 500,000 circ.mil.

The average mine locomotive is rated at 10 hp. per ton, which will require 100 hp., for a 10-ton locomotive, and a current of $(100 \times 746) \div 250 =$, say 300 amp. The linedrop is $0.10 \times 250 = 25$ volts.

The amount of copper for this transmission is, therefore, $(10.8 \times 5{,}280 \times 300) \div 25 = 684{,}300$ circ.mil. Then, using a 0000-trolley wire (211,600 circ. mil.), there will be required a feedwire of $684{,}300 - 211{,}600 = 472{,}700$ circ.mil. This assumes that the trolley wire and the feedwire are in parallel and the locomotive operating at full load.

Now, if less copper is used, more current must travel through the armature and fields than what they are designed to carry to develop the required horsepower. This will cause heating of the coils, commutator and field coils. In time, the armature coils will burn out and the solder run from the commutator, making it necessary to rewind the armature in a short time.

Trouble Often Wrongly Ascribed to "Too Much Current"

It is commonly thought that the cause of a field or armature lead burning off is "too much current." This is ascribed to two causes: first, insufficient copper; second, overload on the motor. Half the time, however, it can be traced to the cause first named.

Bearing these facts in mind, what can one expect when several locomotives and a number of mining machines are operated on a 0000-trolley wire? Is it at all strange that burned out armatures are the frequent result? It is usually the case that what is saved in installation is spent later in maintenance and repairs.

Johnstown, Pa. ELECTRICIAN.

[Attention should be drawn to the fact that this correspondent has omitted to allow for the loss of voltage in the rail return. For example, using 40-lb. 30-ft. rails, cross-bonded, and 24-in. 0000-rail bonds, the rail resistance for 1 mile will be 0.0748 ohm, making the loss in voltage for a current of 300 amp. $300 \times 0.0748 =$, say 22.5 volts.—EDITOR.]

Slowing Down Fan at Firing Time

Explosion in heading, fan running at normal speed—Better results follow slowing down of fan.

AN ACCOUNT is given by a Kentucky engineer, in *Coal Age*, July 20, p. 95, of a mine explosion that he ascribes as due wholly to the lack of sufficient ventilation. It is not my purpose to controvert that conclusion, but merely to recite an instance in my own experience that was the direct reverse of the one he has given.

The circumstances were about as follows: Some four years ago I had a pair of entries driven in the solid coal and shot with black powder. Rooms were turned off both entries by the entrymen, who always drove the roomnecks. There was an air current of 10,000 cu.ft. of air sweeping the faces of these headings.

When three rooms had been turned on each entry, I would put six loaders at work in the rooms, who with the entrymen made eight loaders in all those headings. An old experienced shotfirer was employed to fire the shots and this was done at night, after the men had left the mine.

A Series of Explosions

One night the shotfirer had an explosion that blew out all the brattices and trapdoors for a distance of 2,000 ft. back on these entries. The following week another explosion occurred with the same result and, again, still another a few nights after that one. Naturally, the shotfirer became alarmed and quit.

At this point, another shotfirer was secured and he decided to slow down the fan when firing shots in the mine. The result was that we had no more explosions, until the rooms had been driven to a depth of 70 or 80 ft. The fan was, then, again running at normal speed when, one night, an explosion occurred and the shotfirer was burned; although he was able to come out of the mine and report it to me before I had left for home.

In performing his work, the shotfirer stated in making his report, that he had found a small amount of gas in a crosscut at the face of the entry. He

told me that he had one shot at the face of the entry, one in the crosscut and one in No. 8 room, which had only just been widened out. There being no shots prepared in the next two rooms, he said he was just entering room No. 5 when the shots he had lit at the face went off and the explosion followed.

Leaving him on top in the care of a first-aid man, I took his buddy and went below. We found a trapdoor open and three brattices blown out by the force of the explosion. I examined both entries and rooms for gas, but found none. My conclusion was that the entry shot went off first and raised a cloud of dust that was ignited by the other shots, making this a dust explosion.

As that was the only section in the mine with which we had any trouble, I had the entries cleaned up and kept them well sprinkled. I also arranged to short-circuit the air on those headings at the time of firing the shot. The result has been that we have had no further trouble from that source on those entries.

Herrin, Ill. PETE BOLAND.

When to Seal

Ventilation insufficient—Sealing off to extinguish fires — Draining gas through boreholes.

PERMIT me to offer a word giving my view in regard to sealing off abandoned areas in mines, which has been under discussion in *Coal Age* and in which I am greatly interested. What I have to say will bear more particularly on mines that are generating gas.

There are, no doubt, instances where the only thing to do, in order to make the mine safe is to seal off abandoned places. This is particularly true where the ventilation is normally insufficient to dilute and render harmless the gases generated in the old workings.

Under such conditions, we realize that any drop in atmospheric pressure (fall of barometer) will be accompanied by a considerable outflow of gas, from abandoned places, into the live workings. Then, if the volume of air in circulation is not adequate to meet this condition, there is danger arising from the unsealed areas where the gas has accumulated.

SEALING TO EXTINGUISH FIRE OR TO CLOSE WORKED-OUT PANEL

Mention has been made, in this discussion, of the need of sealing off places for the purpose of extinguishing a fire that has started from one cause or another and defies other means of treatment. It is unnecessary to dwell on this aspect of the subject, which we all agree is the thing that must be done.

Again, when it is necessary to adopt a costly method of panel working, occasion will often require the complete sealing off of a panel. That will generally prove the safest plan to follow when such panels have been worked out and abandoned. The sealing off of a panel will regulate, or control the flow of stythe or other gases from such areas.

We have, doubtless, many mines in such a lost condition, in respect to ventilation, that it is impracticable to deal with certain abandoned areas by any other method than sealing. In this Dugger coal field, there is No. 10 mine that affords an example of such a case. In that mine, it would not be safe to handle the large abandoned areas in any other manner.

GAS DRAINED THROUGH BOREHOLES AVERTS DANGER IN MINE

The management of No. 10 mine have adopted the plan of drilling boreholes from the surface, into each abandoned and sealed area. This plan gives a vent for the gas generated in the sealed portions and avoids the danger of those gases being forced out through the seals into the live workings.

In my opinion, it is a dangerous practice to allow these pent-up gases to be released and flow into the mine through a pipe built into the seal. According to all accounts, this is the procedure in some districts. It may seem a radical statement to make; but, to my mind, such a practice should be prohibited by state laws that would close down the mine where it is done.

I firmly believe that the continuance of such practice will eventually pay a high price in life and property. Certainly, men employed in mines where the gas is led through boreholes extending to the surface will feel safer than where this gas is released into the mine. W. H. LUXTON.

Linton, Ind.

Timbering Hard Roof and Bottom

Experience of a timberman—Setting posts on pieces of slate and mounds of slack unsatisfactory — Tapered posts give best results.

MY EXPERIENCE in timbering mines where both the roof and floor are hard may be of interest to "Timberman," who writes from Iowa, *Coal Age*, July 27, p. 136, saying that he has had trouble by reason of the roof pressure breaking the timbers where the roof and bottom are hard.

In reply to that inquiry, the editor has described the main principles of post timbering, and mentions several methods that have been employed to avoid the destruction of posts, under the condition named.

In a practice of several years, I have used all of these methods and still another not mentioned; namely, setting a post on a piece of slate, after the custom of some miners. However, my conclusion is that there is but one reliable method on which dependence can be placed with certainty. That is to employ tapered posts and use good cap-pieces at the roof. A post set in this manner will take the weight slowly and seldom be broken.

When a post is set on a piece of slate, the latter is almost sure to be broken when the weight comes on the timber, or the post will fall out. The same result follows when a post is set on a mound of dirt or slack, unless the work is done properly and just the right amount of soft material used to take up the settlement of the strata.

EXPERIENCE MUST DETERMINE

Experience in a given district may enable this method to be used successfully. But, my observation is that when too much slack is used, the timber will either be shot out, or will fall out of itself. Again, if too little slack is used, the oncoming weight will break the post, the same as if it was set on the hard floor.

The one method that I have found seldom, if ever, fails is to taper the foot of the post, as described and illustrated in the reply given to the inquiry, on page 136. A good cap-piece must also be used above the post, which will help to distribute the pressure on the roof and bind the top of the post together.

FOOTBOARDS AND CAP-PIECES USED

Some prefer to use footboards on the floor and cap-pieces at the roof, in preference to tapering the posts. With any amount of roof pressure, however, the timber will generally be forced through both the footboard and the cap-piece and, in some cases, the pressure will break the timber.

At times, I have known tapered props to yield as much as four or five inches, under the pressure of the overburden. Indeed, I have observed tapered posts still standing, after two or three years. Seldom have I known a post that is carefully tapered to be broken or fall out. TIMBERMA.N

Herrin, Ill.

ANOTHER LETTER

AFTER reading, with deep interest, the reply to an inquiry in reference to avoiding the trouble often experienced in setting posts between a hard roof and floor; and after giving the matter careful consideration, I am inclined to believe that the chief cause of trouble, in this case, is the lack of a suitable system of timbering.

Notwithstanding the hard roof and floor, it should be possible to timber this 6-ft. seam of coal, under 250 or 300 ft. of cover, without serious difficulty if the system adopted is suited to the conditions in the mine.

ONE GOOD RULE TO REMEMBER

While it is possible to make numerous suggestions regarding troubles experienced in timbering, there is one general rule to remember. It is always practical to keep the working places well timbered, as the coal is mined, and to maintain a good supply of posts in every place.

My advice to this correspondent is to keep his timber within 4 ft. of the face, setting the posts in rows and at a distance of 3 ft. 6 in. apart. Use only oak timbers, 8 in. in diameter at the small end, using a soft cap-piece over

each post. Chestnut makes a good wood for that purpose, though there are other soft woods that can be used.

Not long ago, I visited a mine, in Kentucky, where the coal varied from 4 to 6 ft. in thickness. After a careful examination, I was unable to find an oak timber in the place. To my surprise, I was informed that the mine officials would furnish no other than soft timber.

Throughout the mine, the posts appeared very old, many being decayed and full of worms. The diameter at the small end ranged from 3 to 6 in., and the bark was still on the timber. Many of the posts were broken and others had fallen out. The rooms were driven very wide, with narrow pillars between them, which would explain the general condition of the timber.

I cite this case as showing the little attention given, in some mines, to the use of a good system of timbering—one that is adapted to the conditions. This, to my mind, is the keynote of the situation in most every case.

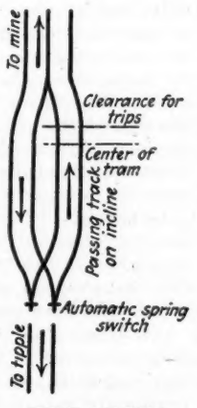
Wilder, Tenn. OSCAR H. JONES.

Self-Acting Gravity Plane

Difficulty with rope on a single-track plane—Three-rail system above passing track avoids trouble—Clearance at upper end of siding marks center of tram.

REFERRING to the inquiry on the question of installing a self-acting gravity plane, *Coal Age*, Aug. 10, p. 211, kindly permit me to offer a suggestion that, if adopted, will greatly simplify the operation of such a plane.

With a single-track tram, there is always considerable trouble experienced in keeping the rope clear, above the siding. It is evident that when the empty trip reaches the switch at the upper end of the siding, that branch of the rope attached to the loaded trip must be carried on the outside of the track, or it will interfere with the ascending empties.



SELF-ACTING GRAVITY PLANE

In order to avoid this difficulty much skill will be required in placing the sheaves and rollers; and, even then, there is bound to result considerable annoyance and expense in the operation of the plane. It is far better to adopt some method that will keep the rope clear and avoid a possible accident by reason of the rope jumping the sheave at the side of the track.

Experience has shown that the proper procedure is to carry a single track from the tipple up to the siding or passing track. Then adopt a three-rail system above the siding and reaching to the top of the plane.

This arrangement will cost a little more to install, but it will give far better satisfaction than to use a single-track system throughout. Moreover, there will be required but one switch at the lower end of the siding, which means less labor to keep it clean and in working order.

The accompanying figure makes clear the arrangement of the system. Care must be taken, however, to have the point of clearance a little above the center of the tram, so that the ends of both ropes will be a little below the point where the trips clear each other. It hardly seems necessary to state that the clear length of siding should be sufficient to hold the number of cars that are to be hauled in a trip.

D. S. ALLISON,
Sullivan Machinery Co.
Salt Lake City, Utah.

Inquiries Of General Interest

General Mine Potential for Split Circulations

Every Mine Has a Certain Potential Value—The Potential Evaluates the Mine in Respect to the Circulation of Air—Summation of Split Potentials Explained

SOMEWHERE I have seen it stated that a mine ventilating fan, running at the same speed, will not give the same volume of air, at different mines. While this has always seemed strange to me, I have never had the opportunity of testing the truth of the statement until recently.

The matter was forcibly impressed on my mind, however, when I undertook to transfer a 14-ft. Jeffrey fan, from No. 1 to No. 2 mine. In the old location, this fan had been giving 280,000 cu.ft. of air per minute, under a 2-in. water gage, when running at a speed of 100 r.p.m.

Much to my surprise, at the new location, while the same speed of fan developed about the same gage, it produced a very much smaller air volume; and it was necessary to increase the power of the engine and drive the fan faster, in order to obtain the volume of air at which this fan was rated, at a 2-in. gage. I would very much appreciate information that will throw more light on this matter. MANAGER.

———, Colo

Only a few years ago, when a mine operator ordered a fan, he thought it was sufficient to specify the volume of air he desired to circulate in the mine. It is now generally understood that the order for a fan must also specify the water gage against which the fan is to operate when delivering the required volume of air. In other words, the present circulation (air volume and gage) must be given as a basis of calculation for determining the size of fan needed.

Every mine has a certain resisting power in respect to the passage of air through the shaft and the underground entries. This resisting power has been called the mine potential. It is the ratio of the sectional area of the airway (or area of passage in the mine, depending on the number of splits) to the cube root of the product of the coefficient of friction and the rubbing surface ($a/\sqrt[3]{ks}$), as expressed in terms of the airway.

This is the power potential. It evaluates the mine in respect to the volume of air that can be circulated therein by a given power. Expressed in terms of the circulation, its value is the ratio of the quantity of air in circulation (cu.ft. per min.) to the cube root of the power on the air (ft. lb. per min.) ($Q/\sqrt[3]{u}$).

On the other hand, the pressure potential is the ratio of the quantity of air in circulation (cu.ft. per min.) to the square root of the unit pressure (lb. per sq.ft.) But, since the quantity of air circulated, in a given airway or mine, varies as the square of the pressure, or the cube of the power, producing the circulation, it is easy to see that the cube of the power potential is equal to the square of the pressure potential. Therefore, calling these potentials X_u and X_p, respectively, we have the following equal values:

$$X^3_u = X^3_p = \frac{Q^3}{u} = \frac{Q^2}{p} = \frac{a^3}{ks}$$

Now, applying these values to the solution of the question in hand, the mine-pressure potential, at No. 1 mine where the fan passed 280,000 cu.ft. of air per minute, under a water gage of 2 in., or a unit pressure $p = 2 \times 5.2 = 10.4$ lb. per sq.ft., is

$$X_p = \frac{Q}{\sqrt{P}} = \frac{280{,}000}{\sqrt{10.4}} = 86{,}820$$

The correspondent has not given the circulation in No. 2 mine previous to the change; but we will assume the mine was passing 125,000 cu.ft. of air per minute, under a 2-in. water gage. In that case, the pressure potential of No. 2 mine is

$$X_p = \frac{Q}{\sqrt{10.4}} = \frac{125{,}000}{\sqrt{10.4}} = 38{,}760$$

In fan design, the best results are obtained when the pressure potential of the fan is from two to two and one-half times that of the mine. A fan so de-

signed will give its highest efficiency. Now, it is clear that a fan designed for No.-1 mine, if operated at No.-2 mine where the potential is practically 4/9 of No.-1 potential, will not produce the same results. While the efficiency of the fan will be increased, say 20 per cent, the volume of air delivered will be little more than one-half of what it circulated in No.-1 mine, at the same speed, or say less than 150,000 cu.ft. per min., at a 2-in. gage.

Practically, for the same power applied to the fan shaft, the volume of air in circulation varies directly as the mine potential. As the potential is decreased, a constant power applied to the fan shaft will slightly increase both the speed of the fan and the efficiency, while the quantity of air decreases.

It is interesting to note that the pressure potential times the square root of the pressure, or the power potential times the cube root of the power gives the quantity of air in circulation, in each case. The practical value of the mine potential is shown in estimating the circulation produced by a given pressure or power, in a mine where the air is conducted through a main airway and then divided into a number of splits, before passing into the main return airway and out of the mine.

In that case, the general mine potential is obtained by the summation of the several split potentials. In other words, the potential for the entire mine is found by adding together the reciprocals of the cubes of the several power potentials and extracting the cube root of the sum. The reciprocal of this root is the mine potential for power.

In like manner, the reciprocal of the square root of the sum of the reciprocals of the squares of the several pressure potentials will give the pressure potential for the entire mine. This will be found a useful application of the potential, in problems that admit of no other method of solution.

Examination Questions Answered

Alabama Mine Foremen's Examination, Birmingham, July 24-27, 1922

(Selected First-Class Questions)

QUESTION—*In what condition and in what parts of a mine is coal dust most dangerous and why?*

ANSWER—Coal dust is most dangerous when it is in a finely divided state and carried in suspension in the air. In this condition, it lodges on the timbers, the roof and sides of all roads and air-courses. In mines where blasting is performed, the accumulation of fine dust at the working face is a source of grave danger, because of the dust being blown into the air by the force of the shots and ignited by the flame produced in blasting.

QUESTION—*How is dust, without being removed from a mine, rendered harmless and non-explosive?*

ANSWER—The surest method of dealing with dust, in mines, is to effect its regular and complete removal, as far as that is practicable. Permit no accumulations of fine dust in the working places. In mines where the dust danger is serious and the coal highly inflammable, an efficient sprinkling or spraying system should be installed on the roads and air-courses and every means adopted to prevent the accumulation of dust. Strict regulations should be enforced in respect to blasting the coal and only permissible powder should be used. It has been suggested that a mixture of salt with the stemming, in blasting, is an effectual means of distributing salt in the working places and in the waste. The trial of this means of overcoming the dust danger has proved effective in numerous instances and is now employed in many dry and dusty mines. The salt acts to reduce the tendency of the fine dust and slack to fire in the waste.

QUESTION—*What measures, if adopted and properly executed, would reduce the production of dust or the accumulation of dust?*

ANSWER—No means is more effective for reducing the production of dust, in mines where blasting is performed, than the enforcement of strict regulations limiting the amount of powder to be charged in the holes; and determining the location, direction and depth of drilling the holes, the exclusive use of permissible powder and the careful inspection of all holes by safety inspectors before shots are fired. In machine mines, the cuttings should be removed in dust-proof cars. Greater safety is insured and a less production of dust occurs in mines where all holes are drilled, charged and fired by competent shotfirers.

QUESTION—*Give, in detail, the plans you would recommend for keeping a dusty mine in a constantly safe condition.*

ANSWER—First, employ the method of mining the coal that is best adapted to the particular conditions existing in the mine. This will require a careful and close study of the character of the coal and the method by which it can be extracted with least danger. Second, employ safety inspectors charged with the duty of inspecting the mine during working hours and preventing all unsafe practices. Third, provide an ample circulation of air and an efficient method of ventilating all working places in the mine. Where blasting is performed, use only permissible powder and employ shotfirers to examine, charge and fire all shots, and having authority to forbid the firing of any holes that, in their judgment, are unsafe. Lastly, install an efficient spraying system in the airways and working places.

QUESTION—*What precautions would you take in the management of a dry and dusty mine generating explosive gas, with reference to the protection of life and property?*

ANSWER—Equip the mine with duplicate ventilating fans of ample capacity. Adopt a method of working that will insure the production of a minimum amount of dust in the mining of the coal. Use only permissible powder in blasting and employ dust-proof cars for hauling the coal in the mine. Employ shotfirers to examine, charge and fire all holes drilled by the miners. Install an efficient spraying system throughout the mine. Make and enforce strict regulations in regard to the examination of the mine by firebosses and safety inspectors. Permit no open lights, but furnish the miners with electric cap lamps. Permit no accumulations of dust in the working places and have all roads and travelingways cleaned at regular short intervals.

QUESTION—*What precautions should be taken in blasting to safeguard the employees in mines that are dry and dusty and generating explosive gas?*

ANSWER—Use permissible powders only and employ competent shotfirers to examine, charge and fire all holes drilled by the miners. This work must be done after the men have left the mine. The firing should commence on the end of the air and proceed in order against the air current. Each place must be carefully examined for gas before a shot is fired therein.

QUESTION—*What, in your opinion, are the principal causes of the greatest number of fatalities in our mines? Give a list of six causes in the order in which you have seen them occur.*

ANSWER—The principal cause of fatal accidents in mines is falls of roof and coal at the working face. The following six causes of accidents in mines may be given: 1. Falls of roof and coal. 2. Premature blasts or unsafe practices in blasting. 3. Movement of cars and motors in mines. 4. Overcome by gas. 5. Contact with live wires. 6. Hoisting accidents or falling down shafts or slopes.

QUESTION—*If a water gage placed in a door 4 ft. 6 in high and 5 ft. wide showed a reading of 2.7 in. what is the total pressure on the door?*

ANSWER—A water gage reading of 2.7 in. corresponds to a pressure of $2.7 \times 5.2 = 14.04$ lb. per sq.ft. The sectional area of the door is $5 \times 4\frac{1}{2} = 22\frac{1}{2}$ sq.ft. The total pressure on the door is then $14.04 \times 22\frac{1}{2} = 315.9$ lb.

Texas Unaffected by Strike Developments; Large Mines Operate Open-Shop

RECENT DEVELOPMENTS in the national coal strike have not affected Texas mines. Most of the larger mines in Texas are operated on an open-shop basis, while those involved in the strike at this time are involved because of local labor disturbances and not because of the national strike, according to W. N. Willis, secretary of the Southwestern Electrical, Coal & Gas Asociation, with headquarters in Dallas, Texas.

The larger coal sections of Texas are in the vicinity of Eagle Pass, Thurber and Laredo. The mines at Eagle Pass and Laredo are not affected by the strike, being worked by non-union labor. In the vicinity of Thurber, the Texas Pacific Coal & Oil Co. is the largest operator. One mine of this company has been in operation since a few weeks after the strike was called, an agreement having been reached. Another is being operated on the open-shop basis. The two mines in operation are working about 200 men, against a normal working force of about 800 men. Output of the mines, which in normal times ranges from 1,000 to 1,400 tons of coal daily, is now about 300 tons.

While the coal shortage has not been felt in Texas during the summer, it is likely to become acute, especially if cold weather comes early, according to wholesale and retail coal dealers, many of whom maintain distributing plants at Dallas. If the railway strike continues and the railroads are unable to handle the coal cars promptly when the mines are reopened, the shortage will become much worse.

"The shortage of coal is being felt now in Texas," R. H. Young, vice-president of the Southern Fuel Co., of Dallas, declared. "The Southwestern mines are to be reopened under the recent agreement reached between operators and miners. Although the mines may be reopened at once and operated on full time, the supply of coal will not be adequate to the demand for months, and not then if a car shortage results on the railroads as is now indicated."

"If the Southwestern mines were reopened immediately, the coal shortage could not be relieved until late in the winter," Charles C. Taylor, manager of the Southern Coal Co., declared.

Harry Penniman, Jr., of the Penniman Coal Co., declared that although the situation is bad, coal consumers of Dallas will be able to obtain sufficient supply for all emergency needs, provided the railroad strike does not interfere with the movement of coal to a great extent.

"Coal is wanted everywhere at present," according to W. H. Pulliam, vice-president of the Pulliam-Trewitt Coal Co. "We are receiving orders for coal from many of the smaller towns in Texas, and it is almost a certainty that the smaller towns will suffer most from a fuel shortage when cold weather comes. It will require several months, at least, for production to meet needs. Virtually all coal yards are empty, but our company has been fortunate in obtaining a supply from Colorado and New Mexico mines."

The supply of anthracite coal has been exhausted at Galveston, which draws its supply of domestic coal mainly from non-union soft coal fields, and this source has been ample for all needs. Bunker coal for Galveston ships is also drawn from such non-union fields as have been little affected by the strike.

Coal operators in Oklahoma have made no attempt to open the mines since the strike of coal miners was called, according to officers of the Oklahoma Coal Operators' Association. According to these officials, conditions in Oklahoma are somewhat different from conditions in other states. It is pointed out that most of the railroads and practically all the public utilities of Oklahoma burn crude oil as fuel, and large stocks of crude are in storage for the future. Very few industries use coal for fuel and it is declared that coal mined during the summer months never finds ready sale, but the operators are forced to place it in storage.

Utilities Consume More Coal During June And July Than in Earlier Strike Months

Coal consumed by electric public utility power plants during June was 2,489,321 net tons, according to the recent report of the Geological Survey. June consumption by these plants was the heaviest of any month since the beginning of the strike—April, 2,456,592 tons and May 2,471,123 tons. During March, the latest pre-strike month, 2,722,146 tons were consumed.

The average daily output for June was 127,700,000 kw.-hr., the highest rate of daily production of electricity yet reached and exceeding the daily production in May by 3.5 per cent. The proportion of the total output of electricity produced by water-power declined from 43 per cent in May to 41.4 per cent in June.

During July 2,566,658 net tons of coal was consumed by these plants. Although this is slightly greater than the tonnage consumed during June, the increase is due largely to July being a 31-day month. Average daily consumption in July was 82,800 tons, compared with 83,000 in June.

The average daily production of power during July was 124,000,000 kw-hr., a decrease of 3 per cent from the record rate for June. The decline in the production of power was in plants operated by water power, due to the decrease in water available during the summer for power purposes.

Railways Consume Less Coal in June Than In May; Six-Month Total Below Last Year

Class 1 railroads consumed 6,787,000 net tons of coal in June, 1922, as charged to account 394, compared with 6,774,000 tons during the corresponding month last year and 6,953,000 tons during May, according to a report made by the Bureau of Statistics of the Interstate Commerce Commission, covering 182 steam roads. For the six months ended June 30, 1922, these roads consumed 45,077,000 net tons; during the same period last year they used 45,619,000 tons.

The delivered cost per ton of the coal used during June was $3.83; last year it was $4.09. For the first five months of 1922 the per-ton cost was $3.58 as compared with $4.42 in 1921.

Consumption of fuel oil by these roads is steadily gaining. During June 119,359,000 gallons was used, as compared with 108,899,000 gallons in June, 1921, and 118,203,000 gallons in May. For the first six months of this year 711,296,000 gallons was consumed, as compared with 696,808,000 gallons in 1921.

Lake Coal Loaded During Season to End of July*

(In Net Tons)

Ports	Railroads	1922 Cargo	1922 Fuel	1922 Total	1921 Cargo	1921 Fuel	1921 Total	1920 Cargo	1920 Fuel	1920 Total
Toledo	Hocking Valley	1,492,230	36,331	1,528,561	2,349,553	61,521	2,411,074	982,138	17,619	999,757
	Toledo & Ohio Central				646,417	18,206	664,623	475,130	25,843	500,973
	Baltimore & Ohio	1,649,323	40,916	1,690,239	1,365,697	38,589	1,404,286	298,523	11,733	310,256
Sandusky	Pennsylvania	975,982	27,879	1,003,861	800,265	22,079	822,344	400,166	4,802	404,968
Huron	Wheeling & Lake Erie	7,612	334	7,946	1,020,112	26,182	1,046,294	806,672	50,894	857,566
Lorain	Baltimore & Ohio	17,820	16,069	33,889	1,594,796	58,398	1,653,194	1,125,146	99,181	1,224,327
Cleveland	Pennsylvania	44,805	22,543	67,348	1,312,504	44,878	1,357,382	170,644	57,028	227,672
	Erie				276,161	8,448	284,609	19,903	1,955	21,858
Fairport	Baltimore & Ohio									
Ashtabula	New York Central	31,083	15,391	46,474	817,040	33,595	850,635	392,526	108,069	500,595
	Pennsylvania	30,392	16,708	47,100	1,529,437	48,159	1,577,596	405,559	40,375	445,934
Conneaut	Bessemer & Lake Erie	58,139	1,207	59,346	592,120	7,443	599,563	1,104,633	17,936	1,122,569
Erie	Pennsylvania	28,607	31,148	59,755	711,560	35,659	747,219	72,698	39,736	112,434
Total		4,335,993	208,526	4,544,519	13,015,662	403,157	13,418,819	6,253,738	475,171	6,728,909

* Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, Mgr.

Plaintiffs Urge Rehearing of Coronado Case

Petition for rehearing of the so-called Coronado coal case, in which the U. S. Supreme Court on June 5 handed down a noteworthy decision holding that labor unions, although not incorporated, are suable and liable for damages resulting from acts of their members on an authorized strike in matters affecting interstate commerce, was filed with the court Thursday by John W. Davis in behalf of the Coronado Coal Co. and others, plaintiffs in the original suit against the United Mine Workers of America.

The Supreme Court, while rendering a broad opinion in the case and establishing a new principle of legal procedure against labor unions, held that it could not sustain the award of damages to the original plaintiffs because it had not been established to the satisfaction of the court that the acts complained of were in restraint of interstate commerce during an authorized strike, and expressed regret that this was so.

In the petition for rehearing the petitioners set forth that "Encouraged by the statement with which the court closes its opinion, and believing that the court will recognize the ready possibility of error in drawing inferences of fact from a record so voluminous and complicated, petitioners venture to assert that the decision of the court debarring petitioners from recovery in the present action is founded upon essential mistakes and misconceptions of the facts presented by the record."

The petitioners declare that when the principles of law enunciated by the court are applied to the facts the judgment against District No. 21, U. M. W. of A., must be affirmed, if not also against the International union.

The jury in the lower court declared the destruction of the mine property to be with intent to restrain commerce, the trial judge so declared and the three judges of the Circuit Court of Appeals reached the same conclusion, the petition declares. The mines were not flooded and burned until they were ready to ship coal, the petition emphasizes, calling attention to the insistence of the United Mine Workers upon interstate agreements and to the point that while the Arkansas strike was local in application it was national in policy, because of the national principle of the open shop involved. The motive of destroying the mine property was to protect union operators in Arkansas and other states against the competition of the cheaper mined open-shop coal, the petition recites, which was the motive declared by the jury, the trial judge and the Circuit Court of Appeals. Guards were driven off July 17 and the Hartford and Coronado mines were not burned until July 18 and 20, the petition states.

An award of judgment against the union is again urged because "the mere lapse of time since the injury was incurred will inevitably embarrass the further prosecution of the cause."

The Supreme Court will act upon the petition for rehearing after it reconvenes Oct. 2.

L. & N. July Car Supply in Kentucky Was 57 Per Cent of June's, Tabulation Shows

As a result of the continued argument relative to car shortage on the L. & N. lines in Kentucky, figures are here set forth from a report of the general coal and coke agent of the L. & N. to D. M. Goodwyn, freight traffic manager. They show that car supply was better than many coal men claimed since July loadings were 57 per cent of June's. The report in part reads:

The total number of actual cars of coal loaded at mines on the L. & N. R.R. and branch line connections (moving via L. & N.) was as follows:

	1921	1922	Increase	Decrease
June 1st to 7th, inc.	10,485	16,113	5,628	.....
June 8th to 14th, inc.	10,392	16,013	5,621	.....
June 15th to 21st, inc.	10,430	14,307	3,877	.....
June 22nd to 30th, inc.	13,928	18,125	4,197	.....
Total	45,235	64,558	19,323	.....
July 1st to 7th, inc.	7,938	8,812	874	.....
July 8th to 14th, inc.	10,063	8,647	.....	1,416
July 15th to 21st, inc.	9,525	8,445	.....	1,080
July 22nd to 31st, inc.	12,457	11,331	.....	1,126
Total	39,983	37,235	.....	2,748

The loading by divisions during the fourth week of July was as follows:

Louisville Division	0	2	2	.....
Kentucky Division	65	275	210	.....
Cumb. Valley Division	5,033	2,837	.....	2,196
Knoxville Division	733	557	.....	176
Eastern Ky. Division	3,217	2,560	.....	657
St. Louis Division	428	0	.....	428
O&N Division	622	754	132	.....
Henderson Division	968	1,491	523	.....
Alabama District	1,391	2,855	1,464	.....
Total	12,457	11,331	.....	1,126

In June, 1922, the road established a great record in coal handled, and comparing the 64,558 cars handled in June, 1922, with 37,235 cars handled in July, 1922, it is shown that movement dropped to 57 plus per cent of the June movement, this being due to the shopmen's strike on July 1, which has held back movement of empty cars to the mines and loaded cars from mines. June movement was almost at capacity, but was held back somewhat by the fact that many large consumers did not believe the coal strike would run into July, and as a result waited for reduced freight rates to become effective as of July 1, not figuring that prices would jump.

The L. & N. R.R. was perhaps crippled worse than other coal handling roads in the state. The Illinois Central in western Kentucky has been able to handle from 75 to 100 per cent of cars needed at practically all times, the road reporting 700 to 800 cars handled daily.

Eastern Kentucky Coal Plants Improving

Activity in mining operations throughout the Elkhorn-Hazard coal field of eastern Kentucky has caused a building boom to be in evidence on every hand. At Glemans, below Whitesburg, Ky., the Reliance Coal & Coke Co. has completed a modern new tipple with conveyors and is also erecting 150 new homes for miners. The Imperial Elkhorn Coal Co. at Sergent, has a modern new tipple almost completed. The company also will do much other building. The Lotts Creek Coal Co. and the Ajax Coal Co. are each building modern new storerooms at Lotts Creek. The latter company also is erecting a large number of new houses for miners. The Petry Coal Co. and the New Duane Coal Co., at Duane, are each doing considerable building, as is also the Blue Diamond Coal Co., at Blue Diamond, in the First Creek section.

Other companies making various improvements are the Liberty Coal Co. and the Mitchell-Willis Coal Co., in the same section. Several hundred men have been added to the plants of the Consolidation Coal Co. at McRoberts and the Elkhorn Coal Corporation at Fleming and Haymond.

Central Pennsylvania Fuel Committee Names Officers and Prepares to Function

Members of the central Pennsylvania regional committee of the Pennsylvania Fuel Commission met in the office of the Central Pennsylvania Coal Producers' Association on Aug. 29, and effected an organization and formulated plans for functioning. The responsibilities of the committee have been reduced by reason of the strike's ending but the members will prepare for any emergency that may arise during the coming months.

In attendance were W. Brooke Moore, of Harrisburg, service agent of the Interstate Commerce Commission, and Attorney Thomas C. Hare of Altoona, recently appointed by Chairman W. D. B. Ainey to head the state fuel commission as the representative of the public in the central Pennsylvania district. Others present were Charles O'Neil, representing the operators on the state commission; Rembrandt Peale, H. J. Meehan, B. M. Clark, William Lamont and J. R. Caseley, operators; W. A. Jones, statistician of the Coal Producers' Association; J. T. Carbine, of the Pennsylvania Fuel Commission; W. K. Nichol, of the Buffalo, Rochester & Pittsburgh Ry.; J. D. Beaver, of the Pittsburgh, Shawmut & Northern R.R., and W. H. MacQuown, divisional freight agent of the Pennsylvania Railroad Co. at Altoona.

Charles O'Neil was elected district chairman, and W. A. Jones, secretary. It was decided to allow the business of the district to operate through natural channels as far as possible and the use of priorities will not be made at present.

Price Boosting Ford Rails Against Was Practiced by Him Two Years Ago

Cincinnati, Ohio, Sept. 12.—(Special Correspondence).—In the strong box of the U. S. Attorney in Covington, Ky., there are some interesting data relating to the Banner Fork Coal Mining Co. that would seem to put a different effect upon the complaint that Henry Ford, automobile manufacturer, of Detroit, Mich., is making against the coal trade and the jobbers and brokers in particular. It would appear that Mr. Ford in bewailing the high price of coal is coming before the great court of the general public with a smudge on his fingers, for not long ago Mr. Ford, the owner of a coal mine in southeastern Kentucky, was himself the cause of the same sort of complaint.

It will be remembered that the Ford interests purchased the coal properties of the Banner Fork company in 1920. That was the year that coal prices soared. In some places they rose as high as $10-$12 a ton. It was said at the time that Mr. Ford desired the property so that he could get coal at its original cost.

In taking over the Kentucky property with its equipment Mr. Ford did not turn in to the making of steam coal entirely. There was plenty of lump left over that could be sold on the open market. Most of this went to the Blue Diamond Coal Sales Co., which has its general offices in Cincinnati. Some of it also went to the Riddle Coal Co. of Chattanooga and some to the Bewley-Darst Co., of Knoxville. This was given to them to handle as jobbers, or on a brokerage basis. The ruling, however, was strict that this coal should be handled on a 25c.-a-ton basis, and this at a time when other operating corporations were allowing brokerage greatly in excess of this.

The stipulation also was strict that the price at which this coal was to be sold would be as high as possible, and this is the returns that were made to the Ford company. Then the complaints started to come in. Some of them went whooping to Washington at a time when complaints were no rarity—but the volume of them against the Banner Fork company was sufficient to attract the attention of the Department of Justice and in due time the selling agents for the Banner Fork mines were asked to account for the extreme high prices that were being charged for the lump coal that was being shipped from its tipples.

These reports were forwarded to Thomas D. Slattery, then the District Attorney for that section of Kentucky and located in Covington.

While most of this coal was disposed of in the South, Mr. Ford's mining interests were not askant at trying to sell it north of the Ohio river. A former president of the Cincinnati Coal Exchange who directed the sales department of a large wholesale coal firm at the time remembered this coal very well and the conditions under which it was offered.

"I should say I do," he said when asked about it, "but to the best of my knowledge our firm never was able to sell a ton of it—it was too high in price."

Other firms here recollect the period and the offer of the Banner Fork coal and say that they refrained from handling it because of the small brokerage allowed in view of the high prices that were asked.

Nor does the Ford trail of high prices end there. Others who were selling coal to the Detroit plant at the time say that there was no hesitancy on the part of the Ford interests to pay "the highest in the market" for steam coal and that when it landed in Detroit it was put to the test and that which would not come up to the requirements was resold through Detroit brokers of coal to users in the surrounding territory. It would appear at this particular time that the brokers against whom Mr. Ford now rails were a medium that he found worthy of use.

Salesmen who handled the Banner Fork coal to the south looked up their sales sheets and found that the sales ran from $9.25 to $10 a ton.

Standing upon the published statements of Mr. Ford to the effect that he thought the government price for coal was fair, Michael T. Roach, president of the Logan-Pocahontas Fuel Co., in a telegram to Mr. Ford on Sept. 5, renewed his offer to supply the Ford company with coal at the government prices and urged immediate action in the matter. In his telegram Mr. Roach said that it was possible to arrange to give the entire output of one of his mines to the company although having expressed a desire to retain 25 per cent of the output for other uses.

Following the published announcement last week that the Ford factories were to close for lack of fuel, mainly through Mr. Ford's allegation that profiteers and coal bootleggers were boosting the price, Mr. Roach on Aug. 31 offered to turn over the output of the Wallins Creek Collieries in Harlan County, Kentucky, of about 85 carloads a day and the output of some West Virginia mines. Approximately 15,000 tons a month is produced on the Norfolk & Western line and the other coal is produced on the Chesapeake & Ohio.

In response to the first telegram Mr. Ford made arrangements to have his mine representative, Abner Lunsford, confer with G. H. Marting, representing the Logan-Pocahontas Fuel Co., to determine upon the quality of the coal and arrangements also were made to have the Detroit representative of the Logan-Pocahontas Fuel Co. confer with Mr. Ford. Coal was offered to the Ford company on the basis of a two-year contract at the government prices, it being understood that when the government price changed, the price to the Ford company also would automatically change.

In an effort to get direct action on the matter of supplying Mr. Ford with fuel sufficient to run his factories, Mr. Roach on Sept. 5 sent a telegram to Mr. Ford in part as follows:

> Refer to your telegram of yesterday afternoon reading as follows: "We explained to your representative, Schermerhorn, that we are not buying coal on two-year contracts at government prices and you cannot get cars for loading coal on L. & N. Are you prepared to guarantee regular routing? How many cars are you loading daily? We are not of the opinion that you can make delivery. Why should we pay you $4.50 a ton when we **can load coal at our own mine in your district for $2 a ton?"**
>
> Answering the above telegram as quoted: Answering first two lines, we would not be interested in making a spot price for coal to be furnished your plant without any understanding that shipments could be continued over a definite period. Answering the third line of your telegram we can get as many cars to load on the L. & N. as you or any other shipper can get. We have been supplied at our mines today some eighty cars. Answering the fourth line we are prepared to make the same guarantee in reference to regular loading and car supply that you or any other shipper on the L. & N. could make. Our railroad allotment has increased from eighty-five cars, as previously wired you, to ninety cars on allotment which will be effective the tenth of this month. Answering the fifth line of your telegram, upon what do you base your opinion that we cannot make deliveries? Answering the sixth and last line, none of our telegrams to you should have brought about this inquiry from you. We made you a proposition for two years based upon government price for coal, which would necessarily mean if the price was increased or lowered our price would accordingly change.
>
> If you are mining coal from your mines, as stated, which is costing you only $2 per ton, and employing the same method of charging mine costs as in effect by other operators, including ourselves, which system was put into effect by the government, then indeed you are very fortunate and the balance of us are unfortunate. In addition to this you could not possibly be paying as high a scale of wages as we are paying and put coal on the cars at $2. Now, Mr. Ford, my proposition was made to you in good faith and based entirely upon press statements that you were contemplating closing down your plant on the sixteenth day of this month and giving as the chief reason the profiteering in the coal business.
>
> If the press reports have correctly quoted you as stating that the government price was a fair and reasonable price and that you would pay no more than this for your coal, taking all these matters into consideration and trying to help prevent if possible the great calamity that might result from your closing down on the sixteenth, if you do so; having in mind the distress that might be brought about by the drastic position you say you are going to take and charging same to the coal operators, I feel it the duty of every operator in America to come to your relief. It is not my intention to enter into any discussion pro and con with your subordinates. If you want coal from us we are ready to negotiate on the basis of our first telegram setting forth our proposition.

Fix Maximum Prices for Alabama Coal

Governor Kilby and Fuel Administrator Roy R. Cox announce the following maximum prices for coal from Alabama mines: Big Seam, mine-run $2.60, domestic lump $3.45; Pratt, Jagger and Corona group, mine-run $3, domestic lump $4.45; Cahaba and Black Creek group, mine-run $3.60, domestic lump $5.20; Montevallo and Climax group, mine-run $4, domestic lump $6 per ton. These are maximum prices for the autumn and winter. The retail prices are lower than at this time last year and the steam-coal prices are regarded as reasonable, when the increase of 20 per cent in miners' wages effective Sept. 1 is considered.

Miners' Union Has 25,000 Fewer Members In West Virginia Than Before Strike

As far as it is possible to estimate, it is believed that there are now 25,000 less miners in West Virginia in the United Mine Workers' organization than at the inception of the strike, so that half the membership has been lost.

The New River field appears to be lost to the United Mine Workers entirely, so that as a matter of fact District 29 no longer exists except on paper. That means a loss in membership of from 8,000 to 10,000 miners. New River operators have declined to enter into negotiation with the miners' union and have contented themselves with simply posting the 1920 wage scale and of continuing to operate on an open-shop basis.

Operators in the Georges Creek region have advanced wages to the 1920 level. Just how many miners will return to work in view of the increase in wages remain to be seen. In the Upper Potomac region most of the miners are at work and have been for some time. Officials of the union assert that miners will not return to work until the Cleveland agreement is signed.

Operators of the Georges Creek field assign as their reason for declining to enter into a further contract with the United Mine Workers "the absolute violation of Article 11, Section 1, of the Maryland basic agreement, dated Dec. 11, 1920, which provides for no suspension of work for a period of at least 90 days subsequent to March 31, 1922."

Even under the "Maryland basic agreement," in force until March 31 and which the operators assert that the miners violated, there was no recognition of the union, nor do operators propose to accord the union such recognition now although always having been willing to engage in collective bargaining with the miners.

The new scale in Georges Creek calls for a wage of $1.30½ a ton for pick mining and of $7.26 per day for general inside labor.

The possibility of taking testimony by groups in some of the anthracite tax cases listed for hearing in the Dauphin County Court, Harrisburg, Sept. 12, may cause changes in the plans to hear all of the appeals at that time. It is probable that the eighty or more cases pending will be so grouped and heard. Appeals are now being perfected by some of the large producers, and these will be added to the list.

Mine Fatalities in July Exceed Those of June in Ratio to Output

Coal-mine fatalities during July, 1922, numbered 74 as compared with 162 in July last year, according to reports received by the U. S. Bureau of Mines from state mine inspectors. The reduction was due primarily to the fact that most of the mines throughout the country were closed on account of the miners' strike, which caused the output of coal to decline from 37,693,000 tons in July last year to 17,151,000 tons in July, 1922, a reduction of about 54 per cent. The fatality rate was 4.31 per million tons of coal produced, almost identical with the rate for July last year, 4.30. For bituminous mines alone the July rate this year was 4.05 as against 3.78 for July a year ago. Fatalities in June last numbered 92, or 4.11 per million tons.

During the past nine years (1913-1921) the month of July has averaged 203 fatalities, with an average production of 48,446,000 tons, representing a fatality rate of 4.19.

During the first seven months of the present year 917 men have been killed by accidents at coal mines, as compared with 1,163 during the corresponding period last year, a decrease of 246 fatalities, or 21 per cent. The production of coal has declined about 19 per cent (from 279,869,000 tons to 226,202,000 tons). The fatality rates for the two seven-month periods were 4.16 last year and 4.05 for 1922 per million tons.

With two exceptions, all of the main causes of accidents during 1922 compare favorably with the seven-month record last year and with the entire year 1921. The largest reduction is in accidents from explosives. The rate from haulage accidents is about the same as for the first seven months of 1921 but it is about 14 per cent higher than the average for the whole year 1921. Gas and dust explosions have resulted in a fatality rate more than double that for the year 1921 or for the first seven months last year.

COAL-MINE FATALITIES DURING JULY, 1922, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground												Shaft					Surface						Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total	1922	1921
Alabama	4		1					2					7													7	3
Alaska																										0	0
Arkansas																										0	3
Colorado	2		1										3													3	1
Illinois																										0	8
Indiana																										0	3
Iowa																										0	5
Kansas	2												2													2	1
Kentucky	4												4			1		1								5	11
Maryland																										0	0
Michigan																										0	0
Missouri																										0	0
Montana																										0	2
New Mexico																										0	2
North Dakota																										0	0
Ohio	1		1			1							3													3	11
Oklahoma																										0	1
Pennsylvania (bituminous)	8	2	3			1							14	2				2						3	3	19	20
South Dakota																										0	0
Tennessee	1							1					2													2	2
Texas																										0	1
Utah	1	1						1					3													3	1
Virginia	2									1			3													3	0
Washington																										0	0
West Virginia	14		1	1				2					18						1	1				2	4	22	37
Wyoming																										0	3
Total (bituminous)	39	3	7	1		2		6		1			59	2		1		3	1	1				5	7	69	115
Pennsylvania (anthracite)	2					2							4											1	1	5	47
Total, July, 1922	41	3	7	1		4		6		1			63	2		1		3	1	1				6	8	74	.....
Total, July, 1921	68	6	30	11	4	12	2	10	1	2		4	146	5				5	1	5	1	1		3	11	.....	162

Administration Coal Bills Now in Conference; Passage Expected Next Week

Washington, D. C., Sept. 12, 1922.—Conferees on the bills to create a federal fuel distribution and to control distribution and the price of coal through priority orders of the Interstate Commerce Commission continued their efforts to harmonize the House and Senate measures today with prospects of an early agreement.

The Cummins bill was taken up Sept. 11 by the conferees, who remained in session until late in the evening without reaching any conclusion. Most of the time was devoted to testimony by officials of the Interstate Commerce Commission, who explained how the proposed measure would operate.

The principal difference between the conferees developed over the inclusion in the House bill of references to intrastate coal, which the Senate conferees believed rendered the measure unconstitutional, in view of the Supreme Court's recent decision in the Child Labor case. House conferees insisted the cases were not parallel and that the broader clause was legal because of the commerce clause of the Constitution.

Senate conferees on this bill are Senators Cummins, Kellogg and Smith and House conferees are Representatives Winslow, Newton (of Minnesota) and Rayburn.

As soon as agreement is reached on this bill, conference on the fact-finding commission bills will begin. The House has the same conferees on this bill while the Senate conferees are Senators Borah, Sterling and Walsh (of Massachusetts).

As H. B. Spencer is understood to be unwilling to take over the duties of distributing coal under the Cummins bill, a new federal distributor must be found. No less than fifty names already have been suggested to Secretary Hoover. While it is believed that the position can be filled best by a traffic man, it is possible that some man known to be a good administrator will be chosen if a transportation man of the required caliber cannot be induced to accept the appointment. Among the names being put forward is that of Henry Ford. The suggestion is made seriously on the ground that he has distinguished himself as an organizer and recognizes keenly the desirability of an equitable distribution of coal and the need to suppress profiteering.

Donald D. Conn, of Minneapolis, who is in Washington representing the governors of the states of the Northwest that receive their coal supply largely from the upper lake docks, probably will be named an assistant to the federal fuel distributor to advise on the lake situation.

Varying dates for the expiration of the measure form the greatest difference between the House and Senate bills to control the distribution and the price of coal, the House bill providing a life until Jan. 1, 1924, and the Senate bill providing that it shall expire six months after enactment.

The Senate bill to create a fact-finding commission provides for a commission of five members and includes instructions to report recommendations on the standardization of mines on the basis of production and efficiency, standardization of wages and working conditions and the advisability and wisdom of nationalization of mines and of government control of the industry, while the House bill lacks the latter features and provides for a commission not to exceed nine members. The provision written into the Senate bill directing a separate investigation of the anthracite field with a report to be submitted not later than July 1, next, which was included after the settlement in the hard-coal field, probably will be accepted by the House conferees.

Both the distribution and price-control bill and the fact-finding commission bill were passed by the Senate without difficulty once the time for final vote arrived, although both encountered vigorous opposition from individual Senators. The Cummins bill, to create the office of Federal Fuel Distributor and to broaden the powers of the Interstate Commerce Commission so as to control distribution and prices of coal, was passed Thursday, 40 to 7. It was amended in only two important respects, an amendment by Senator Sutherland reducing its life from one year to six months being adopted and one by Senator Dial, providing that its terms should not apply to contracts for coal at not more than $2 per ton that were made prior to July 25, 1922, being included.

The Borah fact-finding bill was passed Friday, Sept. 8, without any amendments other than those offered or advocated by its author. The vote on this measure was without a roll call, but sentiment had been tested a few minutes before the bill was put on final passage by the rejection, 19 to 30, of an amendment offered by Senator Dial which would have stricken from the measure the instruction to the proposed commission to report on the question of nationalization of coal mines.

Senator King, of Utah, offered an amendment to the distribution and price-control bill designed to prevent speculation in coal by providing that for six years it should be unlawful to purchase coal with intent to influence the market price. After objection, he withdrew this as an amendment and offered it as a separate bill, which was referred to the judiciary committee.

Repeated efforts, through amendments in various forms, were made by Senator Dial, of South Carolina, to amend the bill so as to exempt contract coal. Senator Sutherland also offered an amendment along the same line. Objection was made that some contracts at an unreasonable price might be included and thus defeat the purposes of the bill. Finally, Senator Dial brought his amendment in so as to include coal at not more than $2 a ton on contracts closed prior to July 25, and this was accepted. The South Carolina Senator is interested in a mill which had a contract for coal at $1.90 per ton, he stated, and which could not get delivery because the mine operator could not get cars.

Mine prices of bituminous coal should range from $2.50 to $3.50 in his opinion, Senator Kellogg declared, figures which Senator Sutherland characterized as "absurd."

The whole purpose of the bill, Senator Cummins asserted, was to supply the Interstate Commerce Commission with authority "to classify preferences on account of unreasonable prices that may be charged," and while he disclaimed any intent to criticize coal operators as a class, he declared some power necessary to "check the greed" of those who would take advantage of the situation.

The most strenuous objections voiced against the Borah fact-finding bill were directed against its instructions that the proposed commission report on the advisability and wisdom of nationalization of the mines.

An effort by Senator Shields of Tennessee, to amend the Borah bill so as to exclude from membership on the proposed commission any coal operator or miner met objection from Senator Borah and was defeated. The Idaho Senator declared the President should be free in his selection. The bill as passed excludes members of Congress and executive officers of the government from the commission.

Senator Dial attempted to have the Federal Trade Commission made the investigating agency, instead of a special commission but this amendment was rejected. The South Carolina Senator then tried to have the nationalization and government-control sections of the instructions to the commission stricken out, declaring them to be merely "an invitation to all the disgruntled people of the country to appear before the proposed commission to complain and talk about nationalizing the coal industry."

The Indiana state emergency coal committee has passed into history. The passing was entirely informal. It received official word from the U. S. coal distribution administration that the federal body regards the strike as ended, that it can no longer look after allocation of coal to applicants and that normal trade channels may be relied on to take care of the country's requirements. Governor McCray had designated the Indiana Public Service Commission to co-operate with the federal administration.

May Apply Class 1 Priority to Gas Coal For Utilities Having Contracts

Washington, D. C., Sept. 9.—The Federal Fuel Distributor is receiving urgent requests from numerous artificial gas manufacturing companies for supplies of gas coal, which they are unable to obtain from West Virginia, Virginia, Kentucky and Pennsylvania districts. These requests, Mr. Spencer reports, come from New York City, Chicago and various smaller cities in Michigan, Illinois, Indiana, Iowa, Missouri and other midwestern states. The difficulty in supplying this coal is due to the inadequate car supply in the districts named and to the fact that the gas-coal producing companies are prorating their coal among all parties with whom they have contracts. This means that much gas coal, the supply of which is limited, is being taken for steam-raising purposes. Fuel Distributor Spencer is considering the policy of applying Class 1 priority to gas coal moving to public utilities with whom the mines have contracts.

Dumpings of coal at the lower Lake ports for this week will amount to approximately 600,000 tons, with 9,380 cars reported at Lake ports this morning. As coal is not moving to the Lakes under the normal No. 2 classification in sufficient quantities to make up the Fuel Distributor's program, Priority No. 1 orders are being issued today directing lakeward a sufficient tonnage of coal to insure the attainment of the full Lake program for next week. These priority authorizations are being placed with a view to causing the least possible disturbance to the normal movement of coal. Difficulties experienced in the unloading of iron ore from boats at lower Lake ports have been solved, and there is now no shortage of vessels for the transportation of coal to Lake Superior docks.

The Fuel Distributor has found it necessary to issue Priority No. 2 orders for the movement of a limited tonnage of coal necessary to keep some non-essential industries in the Southeast from closing. Authorization for the movement of 10,000 tons of coal from Norton, Va., to the State Fuel Administration of South Carolina has been given. Representations are being made from time to time that industries will be compelled to close unless given certificates of priority which will aid them in obtaining fuel supplies. These cases are being considered on their individual merits, under a general policy of issuing priority authorizations only where real emergency needs cannot be provided for by other means.

New York Coal Dealers Pledge Support to State Fuel Administrator

Receding from its policy of opposing federal or state administration of fuel supplies, the New York State Coal Merchants' Association adopted a resolution Sept. 8 at its convention at Richfield Springs supporting Governor Miller and State Fuel Administrator W. H. Woodin in their effort to provide an equitable basis for the distribution of coal and pledging full co-operation to prevent a crisis.

Use of bituminous coal as a substitute for anthracite in homes until the emergency is passed, restriction of the quantity given each consumer that all may have coal, and licensing of all dealers, both wholesale and retail, in order to curb irresponsible dealers, were among the measures advocated for dealing with the crisis. The "fair price" differential of 8 per cent fixed for jobbers' profit was denounced as four times too high.

Illinois Protests Priority Order That Favors Domestic Coal

Illinois coal trade is somewhat exercised over the recent amendment to I.C.C. Service Order 24, giving car priority to domestic sizes of coal. A protest meeting held in the office of State Fuel Distributor R. M. Medill in Chicago brought up the argument that the amendment should be lifted because if steam sizes are not readily shipped from the mines they will accumulate to a point where many mines will have to shut down. Two plans of action may result. Mr. Medill on Saturday last urged that a committee go to Washington forthwith and plead with the Interstate Commerce Commission for a temporary repeal on the ground that there is no coal shortage in Illinois now and therefore the ruling should not apply to that state. The other plan which wise heads counsel is that the ruling be observed with all possible rigor so that its effect on coal consumers would cause such loud public complaint that the repeal would be granted.

Cape Breton Miners Return to Work; Recall of District Officers Asked

All troops have left the Cape Breton mining district and the miners have returned to work. All of the mines with the exception of those flooded when the pumpmen left their places are in action again. The flooded mines are being pumped out gradually. The flooding has created much damage in the mines.

Springhill local of the United Mine Workers Union has petitioned John L. Lewis, International president, for the recall of the recently elected officers of District 26, including District President Dan Livingstone. The local asserts that the new officers of the district were instructed to agree to nothing short of the 1921 rates. Instead a compromise was agreed upon with the coal operators.

Distribution of Lake Cargo Coal Loaded at Lake Erie Ports to Sept. 1

Destinations	Net Tons	Per Cent	Net Tons	Per Cent	Net Tons	Per Cent
Lake Superior Ports						
Duluth Superior and Two Harbors	556,694	10.79	6,914,897	43.65	3,528,229	33.09
Ashland-Washburn	77,505	1.50	400,665	2.53	310,881	2.92
Copper Range (1)	222,862	4.32	471,544	2.98	250,357	2.35
Marquette	48,772	.94	103,004	.65	138,420	1.30
Ft. William, Pt. Arthur and Jackfish	63,187	1.23	1,558,876	9.84	782,456	7.34
Other Lake Superior Pts.	.....	.....	37,750	.24	14,867	.14
Totals	969,020	18.78	9,486,736	59.89	5,025,210	47.13
Lake Michigan Ports						
Milwaukee-Racine	916,564	17.76	2,012,007	12.71	1,159,862	10.87
So. Chicago, Ind. Harbor and Gary	713,243	13.81	539,205	3.40	529,438	4.97
Sheboygan to Escanaba (2)	403,165	7.81	1,195,569	7.55	727,872	6.83
Other Lake Mich. Pts.	24,260	.48	140,154	.88	77,293	.72
Totals	2,057,232	39.86	3,886,935	24.54	2,494,465	23.39
St. Mary's River Pts.						
Detour & Lime Island	355,287	6.89	144,430	.91	262,063	2.45
Sault Ste Marie Can	46,195	.89	479,446	3.03	674,214	6.32
Do American	43,193	.83	57,340	.36	93,312	.88
Totals	444,675	8.61	681,216	4.30	1,029,589	9.65
Lake Huron Ports	63,001	1.22	97,552	.62	118,106	1.11
Detroit & St. Clair River Ports	455,521	8.82	539,208	3.40	691,629	6.49
Lake Erie Ports						
Buffalo-Fairport & Toledo	892,310	17.30	22,593	.14	18,574	.19
Other Pts. (Regular)	50,040	.97	61,710	.39	11,297	.09
Totals	942,350	18.27	84,303	.49	29,871	.28
Georgian Bay Ports	129,465	2.50	566,866	3.58	414,818	3.89
Welland Canal, Lake Ontario and St. Lawrence River Pts.	99,954	1.94	497,928	3.14	858,838	8.06
Grand Totals	5,161,218	100.00	15,840,744	100.00	10,662,526	100.00

(1) Hancock, Houghton, Hubbell, Lake, Linden, Portage and Porch Lake.
(2) Escanaba, Green Bay, Marinette, Menominee, Manitowoc and Sheboygan.

Connellsville Output Mounts, Though Strikers Flock to Union Mines

Output in the Connellsville coke region continues to increase slowly and steadily, most of the companies who are operating continuing to import labor. At the same time there is a large exodus of the strikers taking place to union mines in all directions since the union mines have been getting in operation. During the past week the H. C. Frick Coke Co. has fired additional ovens as follows: At Crossland plant, 50; at Leisenring No. 1, 40; at Leisenring No. 2, 40; at Leisenring No. 3, 70; at Davidson, 40, and at Trotter, 70, a total of 280. W. J. Rainey, Inc., has started up the Allison plant with imported labor.

Herrin Grand Jury Has Indicted 59 Thus Far; Jail Is Filling; Union Has Big Defence Fund

THE grand jury in the Herrin massacre case is making good its declared intention of doing its duty in spite of "pressure" and threats. Thus far, after two gruelling weeks of investigation through the hottest kind of southern Illinois weather, it has indicted fifty-nine men on the three charges of murder, conspiracy to murder and riot. Up to Saturday night thirteen of the fifty-nine men—most of them union miners—had been gathered into the Herrin jail and deputies were scouring the country for the others. Many of them gave themselves up through lawyers for or officials of the United Mine Workers of America who have been in Marion, county seat of Williamson County, watching proceedings from the beginning of the investigation.

This group of officials has told Attorney General Brundage it will bring in and surrender every union man who is indicted, providing Brundage will agree in advance to accept bail for their release. Brundage refuses and every man who goes to jail goes there to stay until the case comes to trial later in the month. The union's first attempt to obtain release of the prisoners on bail failed, but it is daily expected that some new effort will be made.

The main interest in the case just now is to see what further action the union forces will take. On Sept. 8 the Illinois miners' executive board, in session at Peoria, voted to assess every Illinois member of the union 1 per cent of his wages as a defence fund for the battle to be waged at Marion. It is estimated that this 1-per cent assessment would raise $250,000 if collected.

The first indictment was that of Otis Clark, which came suddenly out of the jury room on Aug. 31. Attorney General Brundage said he felt that the arrest of Clark served to advance the investigation materially because it showed that the jury meant business. Evidence came easier from the long line of reluctant witnesses after that and on Sept. 7 a list of thirty-seven more indictments was signed. The next day the jury indicted twenty-one more and then adjourned until Sept. 18, when it will resume.

It has announced in a statement to the public that the jury intends to delve thoroughly into the part which the Southern Illinois Coal Co. and its president, William J. Lester, played in the circumstances leading up to the attack on the company's non-union strip mine, June 22, the surrender of the men therein and the slaughter of nineteen and wounding of thirty which ensued. Thus far practically all the indictments have been against union men. If findings are to be made against the coal company or its employees for the killing of two union miners the day before the massacre they will have to be made after the jury resumes, Sept. 18.

The investigation thus far has been greatly hampered by the incompleteness of Coroner William McCown's records of the individuals killed in the riot of June 22 and of the records of undertakers who buried them. The coroner's list identified only ten of those buried. There was a description filed of one more. The others were merely put in graves marked "Unknown" and little or no record made of them. Even the belongings of the slaughtered men were jumbled up or thrown away. Thus the case is much befogged. There is clarity enough, however, in the case of the following dead: C. K. McDowell, mine superintendent, the first man to be killed and for whose death Otis Clark, the first union man to be indicted and arrested, is now held; Robert J. Anderson, Sparta, Mich., who was hanged to a tree and riddled with bullets; J. H. Shoemaker, civil engineer, son of the Mayor of Charleston, Ill.; John Emil; Fred Lang, of Chicago; Arthur D. Miller, of Chicago; Ed Miller, of Chicago, who died wearing a Chicago police badge; Antonio Muklevich, American legionnaire; Robert March, of Chicago, an overseas veteran, and Howard Hoffman, of Huntington, Ind., who was one of those who escaped the slaughter at a barbed wire fence where so many died, but who was caught later, taken to the Herrin cemetery and killed there.

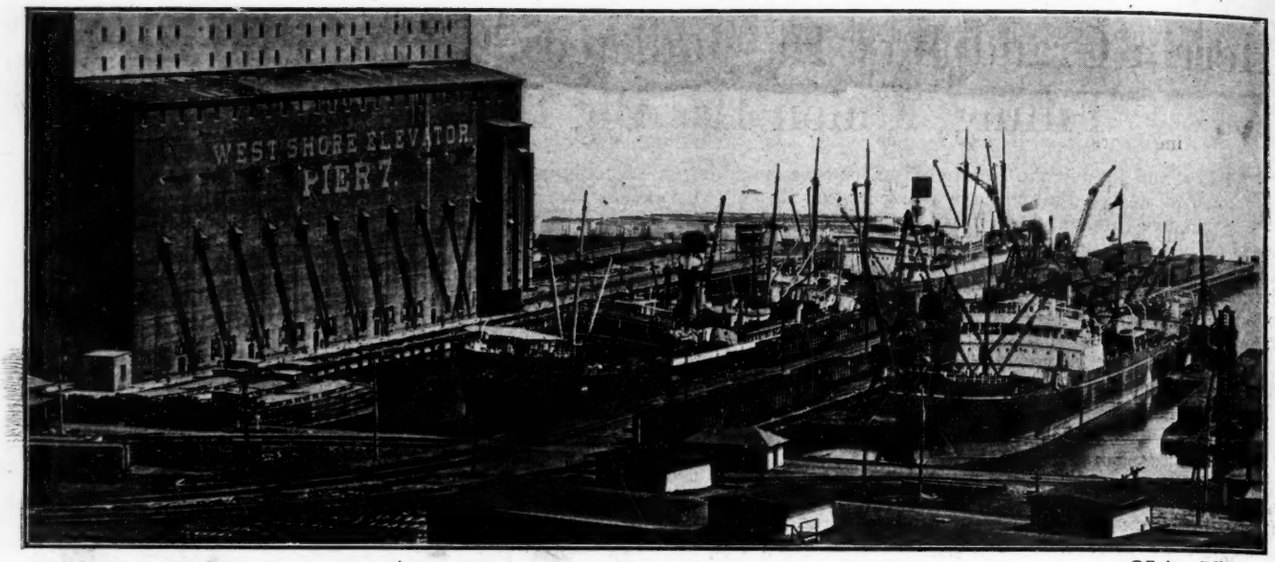
The jury has heard and recorded volumes of testimony about the revolting events of the attack on the mine and the massacre. Several of the victims were savagely mutilated before they were killed. A taxicab driver, who is among the indicted and for whose arrest the jury was especially anxious, is to be charged with driving through the region of the slaughter feeling every victim he found on the ground and cutting the throats of any who gave signs of life. His name is Pete Hiller. Bert Grace, one of the men in jail, is the man said to have stood over a bound group of terribly wounded men in the hot sun and who refused at the point of a gun to allow anybody to give even a drink of water to the dying.

The general sentiment among men who are watching the case and who stand for law and order is that it is going be difficult indeed to mete out full justice to the guilty. The grand jury appears to be doing its level best. It is accumulating a mass of damning evidence against many prisoners and a good many of the indicted men are behind the bars with no sign yet in the troublous county of a jail delivery to free them. It is freely prophesied, however, that when the case comes to trial before a jury impaneled in the regular way, and not hand picked, as the grand jury was, in order to exclude possible partisans, the progress of the case will be difficult. The United Mine Workers of America with a large fund and an array of legal talent purposes making a powerful and intricate legal defence. There is little chance of removing the case from Williamson County because of the constitutional right of every man to be tried within the jurisdiction where the alleged crime was committed and because of his constitutional protection against being tried twice for the same offence. Thus it appears the case must be fought along only those lines now laid down. The federal government, though watching every step, probably cannot take charge of the case for lack of jurisdiction.

The fifty-nine men indicted, including Fred and William Travelstead, sons of one of Marion's respectable families; James Brown, a negro deputy sheriff of the town of Colp, and Otis Clark, president of a miners' union local, are these: Peter Miller, Charles Rogers, Leva Main, Joseph Carneghi, Nava Cannaday, Herbert Rushing, John Rushing, Clyde Lee, James Galligan, Joseph Rhodes, William Stanley, John Kelley, Hubert Walker, James Norris, Roy Pennington, Harvey Perdue, Dallas McCree, Otis Maynard, Alvin Stewart, Joe Murray, Campbell Lively, Wesley McPharon, Frank Adams, Alvin Lolless, Floyd Stokes, George Anderson, Fred McGough, Philip Fontanetta, Tom Weeks, Lee Howard, Louis Corbett, Bert Grace, Gerald Bernard, Peter Hiller, Noble Bell, Lew Corlan, Charles Hancock, Ernie Craig, V. R. Wilson, Henry Skeltcher, Bill Gulledge, Darby Babbington, Sam Catone, Jesse Childers, Orrie Kirby, Earl Baxter, Bill Clander, Fred Cooper, Lee Herron, William Sellars, Fred Travelstead, William Travelstead, Otis Clark, James Brown, Percy Hall, —— Blockhouse, —— Hastings, Giles Holley and Tony ———.

Strike Slowly Petering Out in Utah

It is difficult to say whether the coal strike in Utah is at an end. All but twenty-five or thirty members of the National Guard have been sent home, but no one, including the state officials, is willing to be quoted as saying the strike is over. Following overtures from the strikers the operators met them and offered a new scale of $6.30 and a bonus of 50c. for an eight-hour day. The men rejected this after a two-hour debate and demanded the full rate of $7.95 a day in effect on March 31 and also back pay. In addition to this they asked that all persons quitting or discharged during the strike receive back pay on specified dates. All is quiet in Carbon County and it is believed that the men will accept the offer of the operators before these lines appear in print.



©Ewing Galloway

Buying of British Coal Has Passed the Peak

Late in June British coal began to seep through to the Atlantic ports. It came slowly at first, largely as an experiment on the part of a few Eastern railroads and utilities. As the shortage of home coals became more pronounced, however, heavier orders were placed, taxing British export facilities and calling into service a number of U. S. Shipping Board vessels. This flood of foreign coal reached its peak late in August, when in New York harbor alone 125,000 tons was received in seven days.

As September opened seaports not accustomed to handling a heavy volume of coastwise coals were congested with British cargoes, and even Boston harbor, the best equipped to receive coal by water, was plugged with the arrival of sixteen cargoes. Eight more ships, arriving forty-eight hours later, were forced to anchor and await their turn at the unloading machines. The congestion at New York, with its lower daily discharge rate, necessitated diversion of tonnage to other New England ports. All this means heavy demurrage charges for someone.

Prices mounted with the volume of business placed. When the Shipping Board first chartered a few of its vessels for this business it set a freight rate of 7s., having chartered eighty-nine vessels in all at this writing. The British rate was slightly higher at the outset and rose to 13s.@16s. because of the scarcity of bottoms and the urgency of orders. The Shipping Board rate advanced to 15s., but remained lower than the British figure at all times. British f. o. b. prices also advanced, good Admiralty coal going from 24s. late in June to a high of 32s. 6d. in August.

When late in August production in the United States started upward the effect on the British market was instantaneous. Ocean rates and coal prices began slipping, but the reductions brought little business. Shipments to this country are expected to continue throughout the year and may reach 1,500,000 tons by the end of September. But now, as in the beginning, shipments are largely on firm orders placed by railroads and utilities. A few traders bought cargoes and shipped them "free" to this side when prices were nearing the peak. When American coal quotations declined with better production harbors were congested, heavy vessel demurrage accumulated and this trading speedily became unprofitable.

British coal can still undersell ours in our own seaport markets but with domestic reductions paralleling those abroad the time consumed in filling orders introduces an element of risk that deters coal men from ordering tonnage to throw on the present sensitive spot markets of this country. It requires nearly six weeks' time to obtain British coal, about one-half of which is consumed in ocean transportation. The coal received and still on order is needed to fill the strike gap, but this is rapidly closing. United States production is better and British coal "on spec" faces an uncertain reception on this side of the Atlantic.

The illustration shows three British cargoes of coal being unloaded at New York Central R. R. piers at Weehawken, N. J., across the river from New York.

Deprecating Cause for Alarm, Woodin Urges Economy in Use of Electricity and Gas

William H. Woodin, New York State Fuel Administrator, appointed on Sept. 6 by Governor Miller, has already issued a warning against profiteering, stating that he sees no reason why coal should be any higher in price than it was last winter.

Mr. Woodin, who is the president of the American Car Manufacturing Co., entered upon his duties the day following his appointment and after conferring with the members of the Governor's Coal Commission appointed Colonel William J. Donovan, of Buffalo, legal adviser, and continued in office the existing Coal Commission members.

The Fuel Administrator has been promised the cooperation of the city administration of New York City in his work. He attended the conference of anthracite producers and representatives of the federal and state governments held in Philadelphia on Sept. 7 but before going to the conference Mr. Woodin announced that the state would be divided into nine districts with a district fuel administrator in charge of each.

Names of the nine district administrators will be announced this week and they will meet in conference with Governor Miller and State Fuel Administrator Woodin at Albany.

Permanent offices for Mr. Woodin and his staff have been opened at 165 Broadway, New York City.

It is the intention of Mr. Woodin, in order to avert any emergency that might result from a continued shortage of anthracite, to educate the public in the use of substitutes. He will ask all consumers to exercise economy in the use of electricity and gas, but made it plain that at present there was no cause for alarm.

J. W. PAUL, coal-mining engineer of the U. S. Bureau of Mines, recently examined a fire on Neville Island, Pittsburgh, Pa., in a fill composed of coke breeze, cinders and slag. This fill is 500 ft. wide, 2,000 ft. long and 20 ft. deep. At the time of Mr. Paul's examination the fire was not yet under control and had already caused a loss of more than $300,000.

Agreement Ratified, Anthracite Mining Is Resumed

MINING of anthracite was resumed on Monday, Sept. 11. At Scranton, before noon of that day the United Mine Workers and the representatives of the operators signed the contract that is to insure uninterrupted operations for the next year. The signing of the contract was but a formality following the ratification by the miners' union of the compromise agreement between John L. Lewis and the operators arrived at on Saturday, Sept. 2, at Philadelphia.

According to the decision of the Shamokin convention last January, it was necessary to submit the terms of this agreement to the vote of the men. A gathering of delegates from the locals in the hard-coal region assembled in Wilkes-Barre on Wednesday, Sept. 6, to listen to the speeches of the officials and vote on the proposed contract. The meeting was stormy; it lasted until late Saturday, giving everyone a chance to get his views into the record. But after every supporter and every opponent of John L. Lewis had had his say, the vote was overwhelmingly in favor of acceptance, as Mr. Lewis had said it would be.

The men go back to work at the same wages and with the same working conditions they had before the strike. They are under contract to stay at work until Sept. 1, 1923. They were obliged to forego the advance in wages they had demanded and they did not get the check-off, which they also had among their nineteen demands of last January. On the other hand, the operators did not get the wages of the men reduced, as they had desired, nor did they succeed in providing for arbitration of future wage contracts, a point on which they were urgent.

Delegates to the Wilkes-Barre convention from around Pittston, Olyphant and Kingston were instructed to oppose any ratification of the agreement. Many of the delegates from Shamokin and around Pottsville wore badges on which was emblazoned "Stick and Fight to the Finish." There was a general feeling that Lewis would meet strong opposition. On the opening day he was made chairman of the meeting. Thursday morning Thomas Kennedy, president of District No. 7, read the 55-page report of the scale committee.

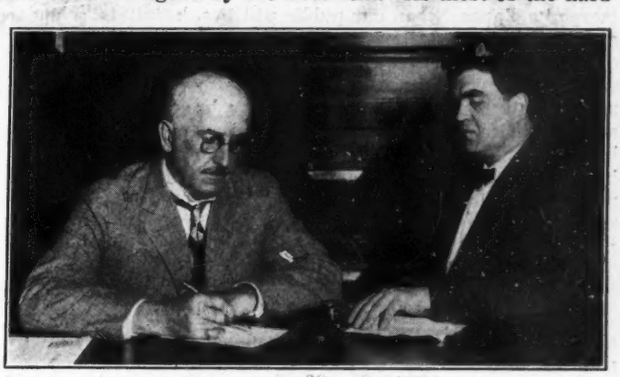
Friday morning he offered the agreement to the convention. Philip Murray spoke at length in favor of acceptance. "We need not delude ourselves at the nineteen demands," said he. "Industrial conditions of the country did not warrant the granting of these demands. All other basic industries in the country have taken decreases. Eighty-five thousand maintenance of way men work at 23c. per hour. Ours is the only organization that kept its wages of 1920. The union that has succeeded in retaining what it has has won a great victory. In principle the victory of the anthracite mine workers is a greater one than that of the bituminous mine workers. Arbitration means that some outside party that knows nothing arbitrarily says to you what hour you shall rise in the morning, what wages you shall receive, and compels you to accept."

After speech-making through Friday and until six o'clock in the evening on Saturday the miners overwhelmingly voted for acceptance of the agreement. The opposition remained silent and registered no vote of protest.

Meanwhile steps were being taken by the national and state governments looking toward control and regulation of the price and distribution of hard coal, when it should again be made available. Secretary Hoover called the representatives of the operators together at Philadelphia on Thursday, Sept. 7, to get their views as to the best way to handle the situation. As a result of this meeting a Committee on the Distribution of Anthracite was appointed. Heading the committee is S. D. Warriner. The others are W. J. Richards, W. H. Williams, W. L. Connell, Alan C. Dodson and John F. Bermingham, all executives of producing companies. E. W. Parker, director of the Anthracite Bureau of Information; R. C. Morse, representing the State Fuel Commission, and W. B. D. Ainey, chairman of the Pennsylvania Public Utilities Commission and acting state fuel administrator, also are on the committee. A member is to be named by Secretary Hoover.

This committee has made no official announcement of any action but it is understood that the sentiment of the trade is that each producer and shipper shall allocate his tonnage equitably on the basis of the last coal year, 1921-22, although it is recognized that until the tonnages that are to be sent up the Lakes and to such distant markets as Canada and northern New England are sent on their way, such ideal distribution will be difficult to realize. The trade has made it plain that in its belief the best results will be obtained with the least interference on the part of the authorities, and it is understood that both Washington and Harrisburg will give the shippers every opportunity to make good. The operators will keep current and definite records of distribution and thereby check up on those who may endeavor to divert coal to take advantage of high prices in certain localities.

If there is to be any check on anthracite prices it will have to come from Washington after the Fuel Distributor bill has been signed by the President. As most of the hard coal goes into interstate commerce the Pennsylvania Fuel Commission has advised the trade that it will countenance no prices or margins higher than those obtained last March, prior to the strike. This advice was tendered to the independent producers and the retailers. Retailers are to be restrained from giving any consumer more than sixty days' supply and shippers are not to furnish coal to any but established dealers.



T. K. MAHER AND JOHN L. LEWIS SIGNING THE CLEVELAND AGREEMENT, AUG. 16

Cumulative production of anthracite for the calendar year to Sept. 1, stands at 22,199,000 tons. This is 39,700,000 tons behind last year and 33,800,000 tons behind 1919. In addition to the current production a considerable tonnage of anthracite has been forwarded from storage. Total shipments of ex-storage coal from April 1 to Sept. 1, according to reports furnished by the railroads, amounted to 95,000 cars, or about 4,250,000 net tons.

PRODUCTION OF ANTHRACITE IN AUGUST, AND CUMULATIVE OUTPUT FOR FIRST EIGHT MONTHS OF LAST EIGHT YEARS

Year	August Production (Net Tons)	Cumulative Production to Aug. 31 (Net Tons)
1915	7,161,000	56,235,000
1916	7,190,000	57,695,000
1917 *a*	9,058,000	66,386,000
1918 *a*	9,258,000	68,484,000
1919	8,086,000	55,994,000
1920	8,105,000	60,829,000
1921	7,459,000	61,917,000
1922	161,000	22,199,000

(*a*) Years of very large washery production.

THE WEST VIRGINIA PUBLIC SERVICE COMMISSION has issued a priority order similar in form to that outstanding with the Interstate Commerce Commission. The order applies to the lines of any coal-loading carrier within the state. Classes of priorities are specified, class 1 being special purposes specifically designated by the state fuel commissioner or his agent; class 2 is for fuel for railroads and other common carriers, public utilities, hospitals, United States, state, county or municipal governments, and for their public institutions.

Scientific Study, Not Emotional Denunciation, Says Hoover, Will Solve Nation's Coal Problem

The favorable progress of legislation for the creation of a national coal commission fully empowered to get to the bottom of the troubles in this industry is the first step in one of the most vital problems we have, according to Herbert Hoover, Secretary of Commerce, in an address before the Salesmen's Association of American Chemical Industry, Tuesday, Sept. 12, 1922, in New York. That he has been earnestly recommending such a commission for the last three years, he declared, was because he does not believe great solutions are to be found out of emotional denunciation, but out of sober, scientific examination. Portions of his address follow:

When the public can be made the victim of infinite loss and suffering by such disagreements as we have witnessed; when the whole nation can, once every two years or less, be pushed to the edge of the precipice of want and commercial collapse; when our public utilities, hospitals. schools, and kitchens are dependent upon short rations of non-union coal; when the federal government is forced to interfere with business and transportation to secure even this movement to essential points; when we are brought to consideration of price fixing against extortion in peace time; when hundreds of thousands of workers not only in the industry but outside of it are thrown into skimping and starving; when the nation is made to suffer the shame of Herrin and rampant crime that has followed in train of strikes—then some examination of our industrial sanity is called for.

Two Problems Requiring Constructive Solutions

There are two distinct lines of problems for which constructive solutions are needed: employer-employee relationship and economic reorganization of the industry.

I believe such a commission would find that collective bargaining, conciliation and arbitration upon their present basis of organization have in sequence broken down in this industry. In this connection if we examine the inside workings of this recent strike we will find situations new in industrial relations. Under freedom from the restraint of trade laws the workers' organizations have grown in strength, solidarity and devotion; they have shown able leadership, whereas the organization of employers for the purpose of collective bargaining has been to a large degree destroyed by the action of these very laws. Without entering into the history or rights or wrongs of this phase, the bare fact exists: That the recent agreement in the bituminous industry was determined by only 15 per cent of the employers, and this minority's decision controlled the whole.

The federal laws on conciliation have failed to obtain any results for peace. The conception of arbitration is a settlement based on mutual agreement to abide by the decision of a third party, but this is now refused "on principle," for in this industry the workers consider that arbitration always results in compromise and that this is compromise with their bread and butter.

Workers have a right to organize to protect and improve wages and conditions of labor. They have a right to collective bargaining. They have a right to strike. They have a right to refuse to join such organizations. They have a right to work without intimidation and assault. Employers have a right to refuse to recognize such organizations. They have a right to lockout. They have a right to keep open shop. No one seriously denies any of these rights, but a lot of people are overlooking a superior right. That is the right of the public to a continuous supply of its vital necessities and services upon terms fair to the employer and employee. When these various rights infringe upon the public right, then the dominant right is public right.

Aside from employee relationships, most of the economic demoralization lies in the bituminous, as distinguished from the anthracite, industry, and my discussion hereafter refers to bituminous alone. This industry, indeed, functions very badly. Some state glibly that it will work itself out if left alone. But it must be borne in mind that it has not been left alone in the past, and the present situation is in large degree due to legislative interference. The control of combinations among operators, without such restraint among employees, the rules of artificial car distribution, the state egislation of various sorts, and other acts, have a great responsibility for the present condition. I am not here questioning the necessity of these measures, but their influence in the situation must not be overlooked, and they must be either supplemented or amended by wise provisions, if we are to have coal peace.

The perpetual labor difficulties are but one of the inevitable byproducts of this poor organization. Labor is struggling on one side to set up remuneration based on such days' pay, and such piece-work rates, as will give a standard of living from 60 per cent of time employed. Labor is thus honeycombed with the worst of stimulants to unrest—insecurity of employment. At the same time, men who have the opportunity to work full time in regularly operating mines earn returns far above the average income of our most prosperous farmers and other workers. There can be no solution either to the operators or to the workers as long as this condition continues.

The largest contributor to overexpansion of the industry is now the almost regular biennial quarrel, with its undue prior demand for coal and its subsequent shortage with temporary high profits. Beyond this the non-union mines in the South are gradually causing the industry to migrate from the North to the South, with consequent overequipment in the North.

Intermittent operation also arises in the chronic annual shortage of railway cars because a sufficient car supply for the short-peak period is economically impossible to the railways. A bad system of distribution of cars to mines by the railways contributes also.

Should Earnestly Consider Co-operative Schemes

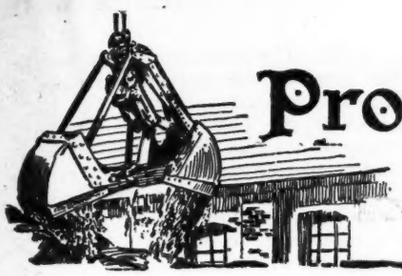
A contributing remedy that will need the most earnest consideration is the possibility of permitting the co-operative system of marketing developed by the farmers to be applied by such mines as wish to adopt it, under circumstances that would assure competitive conditions. Such an arrangement would decrease distribution costs, would give more regular flow to orders, would get better car distribution, would decrease transportation, would enable the laying down of coal in storage at points of consumption, and would consequently give more regular operation with reduced working costs.

It has also been proposed, although I have doubt as to practicability, that there should be a penalty in higher wages for short-time employment. Others propose a basic wage with a participation in the realized price of coal.

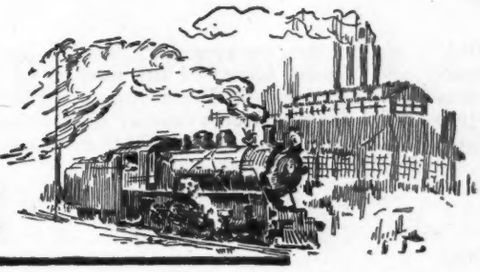
I recognize that stabilization of the industry, or anything that lends stability to the industry, is opposed by a small minority of speculative operators who use the periodically disturbed production to reap a recurrent harvest. It would be opposed on the other side by some of the more narrow-minded labor leaders who contend that their object in all industry is to reduce the number of hours of actual labor to some minor fraction of the whole year, or whose ambition is to drive the nation to socialism in desperation for coal, or who deny the public right to any voice. However, I believe that the constructive men on both sides are in full agreement that we must have a broader and better solution than results from the truces of the past few years.

These periodic wars in the industry are, therefore, in part symptoms of a disease. But, before we treat this disease we must have a more accurate diagnosis. We must have adequate, accurate information from which to weigh the different causes. We must be able to apply to all the test of fact. From such an understanding we should be able to return this industry to sanity. The proposed commission has the greatest opportunity for constructive work.

The public demands results; it is sick and weary of periodic warfare and futile attempts at solution.



Production and the Market



Weekly Review

UNION mined coal is on the market in quantity. Heavier receipts and offerings have softened spot prices in the East. Markets supplied by non-union fields have registered but little decrease in prices and in some cases have shown a slight upturn. So heavily have the facilities of the roads originating non-union coal been taxed in the last five months that the movement of cars and consequent production has been considerably affected.

Coal Age Index of spot prices of bituminous coal rallied slightly, standing at 427 on Monday, Sept. 11, 7 points above last week. The average price was $5.17, as compared with $5.08 in the preceding week.

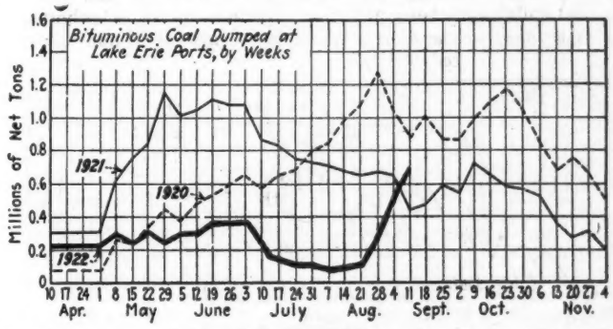
Consumers are floundering around in the market, some trying to cover on contract but many being tempted to delay buying a little longer in the hope that prices may slip down another notch or two. It is the old story of curtailed demand on a falling market with only the inevitable end in view. Delayed demand following the prolonged strike will shortly push prices up as fast as they have in recent weeks declined.

Supply of Surplus Cars Dwindling

The present rate of coal loadings is fast exhausting the supply of surplus cars. Surplus coal cars numbered 111,521 on Aug. 15, prior to general resumption of mining. On Aug. 23, a week later, they were down to 96,405 cars. Resumption of hard-coal mining is causing an additional drain on car supply.

Domestic sizes are already in strong demand and Ohio, West Virginia and some other Middle Western domestic coals advanced sharply last week. Lake buyers, on the other hand, while clamoring for tonnage, disappear at the slightest price advance. Steam coal is heavy at New England, where receipts via water from Hampton Roads and Great Britain have made active canvassing again necessary to dispose of tonnage. North Atlantic centers are in better supply and prices are easier, as is the case in that section of the country east of Pittsburgh and Cleveland. Illinois and Indiana fields are hard hit by car shortage but comparatively light production is so far meeting with light demand.

Welcoming the news of the resumption of anchracite mining the consumer is hopeful that he may not have to resort to the use of much substitute fuel. Dealers,



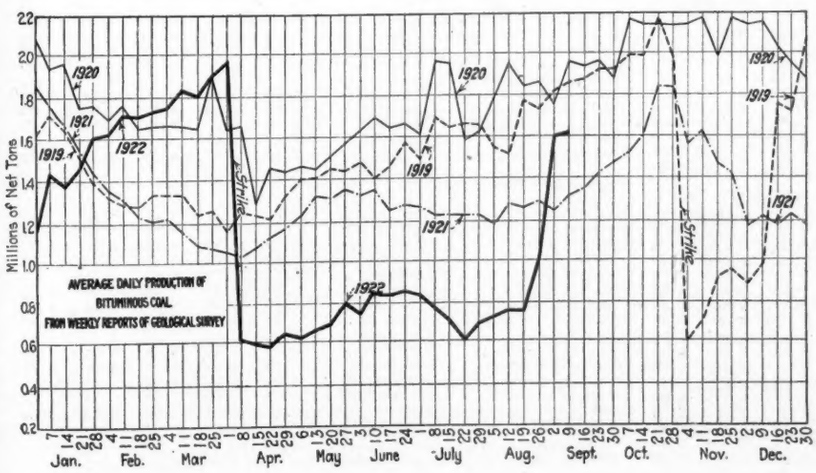
however, are advising the purchase of such fuel to last through October, when it is hoped that small lots of hard coal will again be available.

The Connellsville labor situation is not clearing as fast as was expected. Beehive coke prices are lower but the supply is not heavy.

BITUMINOUS

"Instead of the 9,400,000 tons suggested by the first report, final returns on soft-coal production show only 9,142,000 tons in the week ended Sept. 2," says the Geological Survey. "The record of the week was awaited with interest as an indication of the supply to be expected after general resumption of mining under the Cleveland agreement. Because of the Labor Day holiday, the output for last week can hardly exceed 8,700,000 tons.

"The trend of output day by day is shown by the following statement of cars of bituminous coal loaded. On Labor Day 10,021 cars were loaded by the non-union mines, confirming the experience of other years that the day counts for a



Estimates of Production

(Net Tons)

BITUMINOUS

Week ended:	1921	1922
Aug. 19	7,708,000	4,609,000
Aug. 26 (*b*)	7,753,000	6,736,000
Sept. 2 (*a*)	7,606,000	9,142,000
Daily average	1,268,000	1,524,000
Calendar year	262,753,000	232,702,000
Daily av. cal. yr.	1,272,000	1,121,000

ANTHRACITE

Aug. 19	1,529,000	39,000
Aug. 26	1,800,000	35,000
Sept. 2 (*a*)	1,800,000	38,000

COKE

Aug. 26	57,000	117,000
Sept. 2 (*a*)	58,000	142,000
Calendar year	3,840,000	4,232,000

(*a*) Subject to revision. (*b*) Revised from last report.

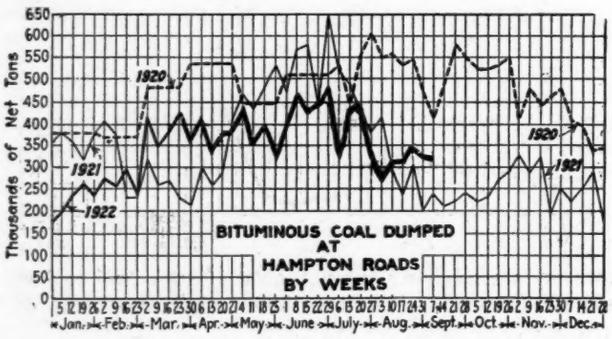
third of an ordinary working day. The double holiday on Sunday and Monday increased the number of empty cars available for placement on Tuesday, and on that day 33,085 cars were loaded, the largest number on any day since last March. On Wednesday, however, loadings dropped to 30,652 cars and on Thursday to 28,238 cars."

DAILY LOADINGS DURING THE STRIKE

	1st Week	18th Week	19th Week	20th Week	21st Week	22nd Week	23rd Week
Monday	11,445	15,102	16,229	15,703	18,601	30,662	10,021
Tuesday	11,019	11,446	13,729	13,032	17,801	28,197	33,085
Wednesday	11,437	12,447	13,368	12,531	18,524	28,641	30,652
Thursday	11,090	12,380	13,277	13,521	19,388	28,687	.....
Friday	11,296	12,669	13,539	13,718	22,882	27,040	.....
Saturday	8,888	12,405	11,009	13,524	23,070	25,517	.....

The all-rail movement to New England was 1,232 cars during the week ended Sept. 2, as compared with 908 cars in the preceding week. Central Pennsylvania grades are offering freely in that market but are slow sellers because of the heavy receipts of water-borne coal from Great Britain and Hampton Roads.

Dumpings at the Roads for all accounts were 315,628 net tons, a slight decline when compared with previous week's figure of 329,695 tons. Receipts at the piers are slowly gaining, despite the heavy Western movement of coal from



West Virginia fields. Prices at the Roads are softer, as coastwise markets are now obtaining ample supplies.

The Federal Fuel Distributor's orders directing coal to the Lakes is reflected in the largest tonnage of the year during the week ended Sept. 11. According to the Ore & Coal Exchange, 623,508 net tons were dumped—594,772 tons cargo and 28,738 tons vessel fuel—as compared with 463,242 tons in the preceding week. The total movement for the season is now 6,300,803 tons; in the corresponding period last year 17,193,280 tons was dumped.

Movement of soft coal up the Lakes will not reach a maximum until the Northwest really wants the coal. At present a buyers' strike is forcing dock operators to stay out of the market.

In the appended table weekly shipments of bituminous coal are brought up to date from the week ended July 15, as published in *Coal Age* July 27, 1922.

ANTHRACITE

It is estimated that full production of anthracite cannot be approached this week or even next, at the very earliest. During the week ended Sept. 2 the output was confined to 38,000 net tons of steam coals dredged from the rivers. This river coal has fallen from grace with the prospect of an early supply of fresh-mined steam sizes. The heavier bituminous coal production also has reduced its sale.

COKE

Production of beehive coke was 142,000 net tons during the week ended Sept. 2, as compared with 117,000 tons in the preceding week.

Shortage of coal cut deeply into the production of byproduct coke during August. The total output was 1,794,000 net tons, a decrease when compared with July of 692,000 tons, or 28 per cent. The average daily production in August was 57,858 tons as against 80,182 in July. The ovens operated at 48.9 per cent, or less than half of capacity. Of the 71 plants, 57 were active and 14 idle.

MONTHLY OUTPUT OF BYPRODUCT AND BEEHIVE COKE (*a*)

	(Net Tons) Byproduct Coke	Beehive Coke	Total
1917 Monthly average	1,870,000	2,764,000	4,634,000
1918 Monthly average	2,166,000	2,540,000	4,706,000
1919 Monthly average	2,095,000	1,638,000	3,733,000
1920 Monthly average	2,565,000	1,748,000	4,313,000
1921 Monthly average	1,660,000	463,000	2,123,000
May, 1922	2,537,000	432,000	2,969,000
June, 1922	2,580,000	458,000	3,038,000
July, 1922	2,486,000	450,000	2,936,000
Aug., 1922	1,794,000	539,000	2,333,000

a) Excludes screenings and breeze.

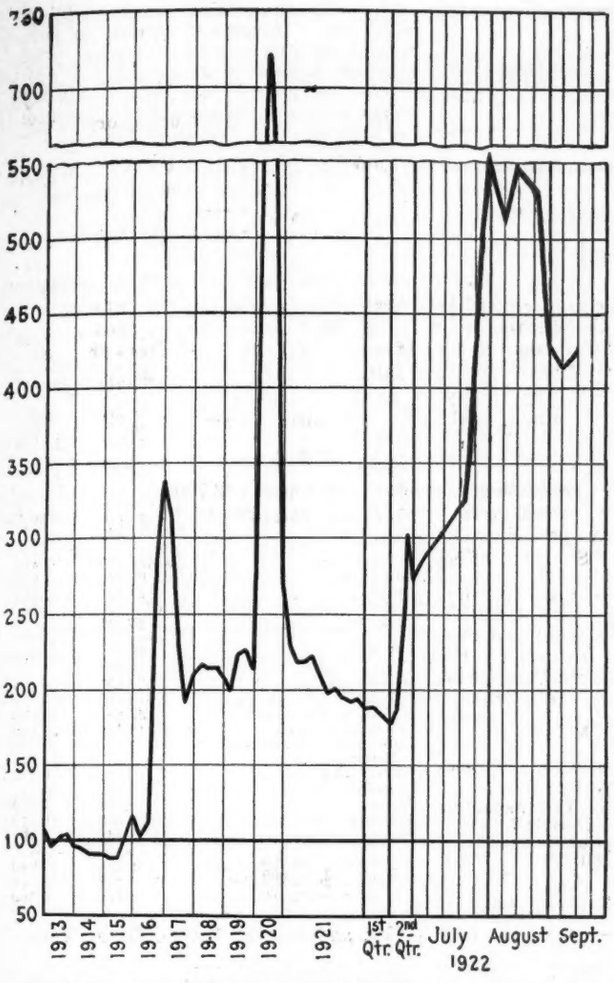
To produce the coke manufactured in August required 3,427,000 tons of coal, of which 2,577,000 tons was used in byproduct ovens and 850,000 tons in beehive ovens. The cut in consumption in byproduct plants was nearly 1,000,000 tons as compared with July.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F. O. B. Mines

Low-Volatile, Eastern	Market Quoted	Aug. 14 1922	Aug. 28 1922	Sept. 5 1922	Sept. 11 1922†
Smokeless lump	Columbus	$6.15	$6.25	$6.10	**$6.00@$6.75**
Smokeless mine run	Columbus	5.75	5.75	5.50	**5.00@ 6.50**
Smokeless screenings	Columbus	5.65	5.60	5.35	**5.00@ 6.25**
Smokeless lump	Chicago	5.85	6.00	6.40	*4.75@ 7.50*
Smokeless mine run	Chicago	5.75	5.75	6.25	*4.50@ 7.50*
Smokeless lump	Cincinnati	5.60	5.75	5.60	**6.00@ 8.00**
Smokeless mine run	Cincinnati	5.50	5.25	4.75	**5.00@ 6.00**
Smokeless screenings	Cincinnati	5.40	5.15	4.40	**5.00@ 6.00**
*Smokeless mine run	Boston	10.15	9.00	9.00	*8.25@ 8.50*
Clearfield mine run	Boston	8.00	5.85	5.00	4.50@ 5.50
Cambria mine run	Boston	9.00	6.25	6.00	*4.50@ 6.50*
Somerset mine run	Boston	8.40	6.00	5.25	*4.50@ 5.75*
Pool 9 (Super.Low Vol.)	New York	.....	6.35	5.75	*5.00@ 5.50*
Pool 9 (Super.Low Vol.)	Philadelphia	8.25	7.25	5.85	*5.50@ 5.75*
Pool 9 (Super.Low Vol.)	Baltimore	7.50	6.25	6.25	*6.00@ 6.25*
Pool 10 (H.Gr.Low Vol)	New York	8.15	5.85	5.35	*4.60@ 5.00*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	8.00	7.00	5.60	*5.25@ 5.40*
Pool 10 (H.Gr.Low Vol.)	Baltimore	7.50	5.85	5.85	*5.50@ 6.00*
Pool 11 (Low Vol.)	New York	7.65	5.35	5.10	*4.25@ 4.50*
Pool 11 (Low Vol.)	Philadelphia	7.85	6.50	5.10	*4.75@ 5.00*
Pool 11 (Low Vol.)	Baltimore	7.10	5.50	5.35	*4.75@ 5.00*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	7.60	.....	5.15	5.00@ 5.35
Pool 54-64 (Gas and St.)	Philadelphia	7.75	6.00	4.75	*4.50@ 4.75*
Pool 54-64 (Gas and St.)	Baltimore	7.50	5.60	5.25	*4.50@ 4.75*
Pittsburgh mine run (St.)	Pittsburgh	.....	.....	.....	4.50@ 4.75
Kanawha lump	Columbus	5.90	6.00	5.85	**6.00@ 6.75**
Kanawha mine run	Columbus	5.50	5.60	5.60	**5.75@ 6.25**
Kanawha screenings	Columbus	5.40	5.50	5.35	**5.50@ 6.00**
W. Va. Splint lump	Cincinnati	5.60	5.35	5.35	**6.00@ 8.00**
W. Va. Gas lump	Cincinnati	5.60	5.35	5.35	**6.00@ 8.00**
W. Va. mine run	Cincinnati	5.50	5.00	5.35	**5.25@ 6.00**
W. Va. screenings	Cincinnati	5.40	4.85	4.85	**5.25@ 5.50**
Hocking lump	Columbus	6.15	6.00	6.25	6.00@ 6.50
Hocking mine run	Columbus	5.75	5.85	5.25	**5.25@ 6.00**
Hocking screenings	Columbus	5.35	5.60	5.25	**5.00@ 5.75**
Pitts. No. 8 lump	Cleveland	7.25	5.75	5.50	**5.50@ 6.00**
Pitts. No. 8 mine run	Cleveland	7.25	5.25	5.25	*5.00@ 5.25*
Pitts. No. 8 screenings	Cleveland	7.25	5.25	5.25	*5.00@ 5.25*

Midwest	Market Quoted	Aug. 14 1922	Aug. 28 1922	Sept. 5 1922	Sept. 11 1922†
Franklin, Ill. lump	Chicago	.....	$5.05	$5.05	**$5.25@$5.50**
Franklin, Ill. mine run	Chicago	.....	4.65	4.65	**4.50@ 5.00**
Franklin, Ill. screenings	Chicago	.....	4.25	4.25	**4.25@ 4.50**
Central, Ill. lump	Chicago	.....	5.10	4.95	4.90@ 5.00
Central, Ill. mine run	Chicago	.....	4.65	4.50	4.25@ 4.75
Central, Ill. screenings	Chicago	.....	4.45	4.30	4.15@ 4.50
Ind. 4th Vein lump	Chicago	.....	5.25	5.25	5.00@ 5.50
Ind. 4th Vein mine run	Chicago	.....	4.85	4.85	4.65@ 5.00
Ind. 4th Vein screenings	Chicago	.....	4.75	4.75	*4.50@ 4.75*
Ind. 5th Vein lump	Chicago	.....	5.10	5.10	4.90@ 5.25
Ind. 5th Vein mine run	Chicago	.....	4.65	4.65	4.50@ 4.75
Ind. 5th Vein screenings	Chicago	.....	4.40	4.40	4.25@ 4.50
Standard lump	St. Louis	.....	3.90	4.65	4.25@ 5.00
Standard mine run	St. Louis	.....	3.40	3.90	*2.25@ 3.50*
Standard screenings	St. Louis	.....	2.90	3.75	*3.00@ 3.75*
West Ky. lump	Louisville	$6.35	5.00	4.25	**4.50@ 5.00**
West Ky. mine run	Louisville	6.25	5.00	4.25	4.00@ 4.50
West Ky. screenings	Louisville	6.10	5.00	4.25	*3.75@ 4.25*
West Ky. lump	Chicago	7.15	4.25	4.25	3.50@ 5.00
West Ky. mine run	Chicago	7.10	4.25	4.25	3.50@ 5.00
South and Southwest					
Big Seam lump	Birmingham	4.75	4.75	4.75	*3.45@ 4.50*
Big Seam mine run	Birmingham	3.85	4.50	4.00	*2.60@ 4.00*
Big Seam (washed)	Birmingham	4.00	4.50	4.00	*3.10@ 4.50*
S. E. Ky. lump	Chicago	5.85	4.75	4.25	3.50@ 5.00
S. E. Ky. mine run	Chicago	5.75	4.75	4.25	3.50@ 5.00
S. E. Ky. lump	Louisville	5.85	5.25	5.00	**6.00@ 6.50**
S. E. Ky. mine run	Louisville	5.75	5.10	5.00	**5.25@ 6.00**
S. E. Ky. screenings	Louisville	5.60	4.75	4.90	**5.00@ 5.50**
S. E. Ky. lump	Cincinnati	5.60	5.35	5.50	**6.00@ 8.00**
S. E. Ky. mine run	Cincinnati	5.50	5.25	5.25	**5.00@ 6.00**
S. E. Ky. screenings	Cincinnati	5.35	4.85	4.85	**5.00@ 5.75**
Kansas lump	Kansas City	6.00	6.00	6.00	6.00
Kansas mine run	Kansas City	6.00	5.00	5.00	5.00
Kansas screenings	Kansas City	6.00	2.85	2.60	**2.50@ 3.00**

*Gross tons, f.o.b. vessel, Hampton Roads.
†Advances over previous week shown in **heavy type**, declines in *italics*.
NOTE—Smokeless prices now include New River and Pocahontas.



Coal Age Indeex 427, Week of Sept. 11, 1922. Average spot price for same period $5.17. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the total output of the United States, weighted in accordance first with respect to the proportions each of slack, prepared and run-of-mine normally shipped and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board. (Pittsburgh District prices not included in figures for last week.)

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Six Months July to Dec. 1921	Jan. 1 to Apr. 1, 1922 Inclusive	Apr. 3 to Aug. 26, 1922 Inclusive	Week Ended Aug. 26
U. S. Total	45.6	55.7	....	....
Non-Union				
Alabama	63.5	64.6	78.9	86.4
Somerset County	55.5	74.9	46.6	54.9
Panhandle, W. Va.	55.3	51.3	46.0	67.7
Westmoreland	54.9	58.8	84.1	88.0
Virginia	54.8	59.9	72.7	54.6
Harlan	53.3	54.8	38.5	10.4
Hazard	51.7	58.4	46.7	27.2
Pocahontas	49.8	60.0	68.0	61.9
Tug River	48.1	63.7	71.3	52.5
Logan	47.6	61.1	57.6	26.5
Cumberland-Piedmont	46.6	50.6	19.0	31.5
Winding Gulf	45.7	64.3	60.3	36.3
Kenova-Thacker	38.2	54.3	70.5	65.8
N. E. Kentucky	32.9	47.7	46.3	31.1
New River‡	24.3	37.9	30.9	34.8
Union				
Oklahoma	63.9	59.6	14.8	21.0
Iowa	57.4	78.4	1.1	24.1
Ohio, Eastern	52.6	46.6	(a)	(a)
Missouri	50.7	66.8	3.8	20.0
Illinois	44.8	54.5	(a)	(a)
Kansas	42.0	54.9	16.8	24.0
Indiana	41.4	53.8	(a)	(a)
Pittsburgh †	41.2	39.8	0.0	0.0
Central Pennsylvania	39.1	50.2	13.8	48.4
Fairmont	35.3	44.0	7.0	51.4
Western Kentucky	32.5	37.7	60.9	58.7
Pittsburgh *	30.4	31.9	0.0	0.0
Kanawha	26.0	13.0	6.9	18.3
Ohio, southern	22.9	24.3	(a)	(a)

* Rail and river mines combined
† Rail mines
‡ Union in 1921, non-union in 1922
(a) Note—Operations began during week. Survey does not report percentage of operation.

Car Loadings and Surplusages

Cars loaded:	All Cars	Coal Cars
Week ended Aug. 26	890,838	110,030
Previous week	856,219	80,959
Same week a year ago	828,881	129,442
Surplus cars:		
Aug. 23, 1922	120,961	96,405
Aug. 15, 1922	140,253	111,521
Same date a year ago	270,024	136,981

ESTIMATED MONTHLY CONSUMPTION OF COAL FOR MANUFACTURE OF COKE
(Net Tons)

	Consumed in Byproduct Ovens	Consumed in Beehive Ovens	Total Coal Consumed
1917 Monthly average	2,625,000	4,354,000	6,979,000
1918 Monthly average	3,072,000	4,014,000	7,086,000
1919 Monthly average	2,988,000	2,478,000	5,466,000
1920 Monthly average	3,684,000	2,665,000	6,349,000
1921 Monthly average	2,385,000 a	731,000 a	3,116,000
May, 1922	3,645,000 a	681,000 a	4,326,000
June, 1922	3,707,000 a	722,000 a	4,429,000
July, 1922	3,571,000 a	710,000 a	4,281,000
Aug., 1922	2,577,000 a	850,000 a	3,427,000

(a) Assuming a yield in merchantable coke of 69.6 per cent of the coal charged in by-product ovens, and 63.4 per cent in beehive ovens.

Railroads Now Most Important Feature In National Coal Situation

With all the advantages of a large surplus of cars, the railroads did not transport coal during the period that the surplus was available at a rate sufficient to tranquillize the market. If only slightly in excess of 9,000,000 tons was transported during the week ended Sept. 2, for instance, it is regarded as a good indication that the railroads will not be able to come anywhere near that figure again while the shopmen's strike continues. On the other hand, it is apparent that enough coal can be transported to meet the necessities for immediate consumption, which will mean that careful attention must be given to distribution until the railroads can handle twelve to thirteen million tons a week.

The Attorney General's injunction has been the source of constant cloakroom discussion on Capitol Hill since the day of its issuance. As Congress is composed so largely of lawyers, the subject is one in which all members are taking a keen personal interest. Little has been said about it on the floor of either house, largely on the ground that discussion of the subject in Congress prior to action on the request for the injunction might be interpreted as an untoward attempt to influence the judiciary.

While it is apparent that the majority of the members in each house, regardless of party, believe the Attorney General's action is entirely justifiable, there are some prominent figures in Congress not particularly friendly to unionism who regard the injunction as smacking of the fifteenth century. To attempt to restrain American citizens from expressing sympathy for the strikers or from holding peaceable meetings goes too far, they think. Such drastic restraints as are proposed in the injunction would be in a better setting in Russia, they contend. They call attention to the fact that the situation is quite different from that of 1894, when President Cleveland made use of the injunction weapon. At that time there had been a general resort to violence and lawlessness. In the present strike there is every reason to believe, they say, that 98 per cent of the strikers are entirely innocent of sabotage.

On the other hand it is pointed out that the government has been more than patient since July 1. It has been patient when every day's prolongation of the strike, with its attendant lawlessness, interruption of the mails and interstate commerce, was costing the majority of the people of the United States a stupendous sum, to say nothing of the inconveniences and the menace to the public health. To temporize with the situation longer would be to admit that a minority element can dominate the government. The radical proposals to call a general strike and to impeach the Attorney General and Judge Wilkerson have done much to bring congressional and public support to the Attorney General.

P. W.

Foreign Market And Export News

British Prices Slip with Waning American Demand; Germany Seeks Coal

British coals are feeling the lessening of the tension in the United States. Orders from North America are dwindling, being chiefly from Canadian sources. Prices are slipping downward again. It is estimated that by the end of September, 1,500,000 tons will have been shipped to fill the strike gap and that the movement, in smaller volume, will continue throughout 1922. Germany is also inquiring for coal, but her financial situation is deterring closings.

Production during the week ended Aug. 26 was 5,148,000 gross tons, according to a cable to *Coal Age*. This is 10,000 tons less than the preceding week's output.

Owing to lessened demand for tonnage, freights from the Tyne to the United States have been reduced and ship-owners are accepting 9s. a ton.

Hampton Roads Pier Situation

	Week Ended Aug. 31	Week Ended Sept. 7
N. & W. Piers, Lamberts Point:		
Cars on hand	1,463	628
Tons on hand	82,043	82,335
Tons dumped	157,733	143,785
Tonnage waiting	53,200	119,950
Virginian Ry. Piers, Sewalls Point:		
Cars on hand	620	1,064
Tons on hand	34,750	61,650
Tons dumped	79,818	70,665
Tonnage waiting	45,199	59,015
C. & O. Piers, Newport News:		
Cars on hand	526	472
Tons on hand	26,000	23,000
Tons dumped	56,820	67,361
Tonnage waiting	19,300	7,520

Coal Paragraphs from Foreign Lands

GERMANY—Production in the Ruhr district during the week ended Aug. 26 was 1,819,000 metric tons, according to a cable to *Coal Age*, as compared with 1,813,000 tons in the preceding week.

ITALY—The price of Cardiff steam first is unchanged at 42s. 3d., according to a cable to *Coal Age*.

French Reduce Heavy Mine Stocks

The situation of the coal mines of the Nord and Pas-de-Calais remains comparatively favorable. Stocks are being reduced, although still running very high. Almost nothing came out of the offers which were made by French coal mines to American producers.

In July, France and Luxemburg received from Germany on reparation account the following: France, 363,473 tons of coal, of which 162,997 tons carried by sea; Luxemburg, 4,969 tons. France received 403,256 tons of coke; Luxemburg, 131,471 tons.

The adjusted price of German reparation coke delivered to French blast-furnaces by the Société des Cokes de Hauts-Fourneaux has been maintained for September at its previous limit of 97 fr. at the Franco-German frontier. On the other hand, from Aug. 1 to Oct. 31, French mines of the Nord and Pas-de-Calais have agreed to sell to the Société des Cokes de Hauts-Fourneaux, for pooling and distributing purposes, metallurgical coke at 95 fr. and coking slack at 67 fr., at mines.

FRENCH IMPORTS IN JUNE AND YEAR TO DATE

	June, 1922	Jan.-June
	(Metric Tons)	
Coal		
Sarre	356,600	1,731,133
Great Britain	865,444	5,966,440
Belgium	227,950	1,247,868
United States	5,755	19,135
Germany	320,496	1,972,472
Netherlands	52,389	394,821
Other countries	304	3,576
Total	1,828,938	11,335,444
Coke		
Great Britain	5,181	36,101
Belgium	52,942	264,693
Germany	344,591	2,045,761
Other countries	25,119	81,950
Total	427,833	2,428,505
Briquets		
Great Britain	17,267	68,786
Belgium	66,623	423,201
Germany	20,889	265,134
Other countries	505	1,972
	105,284	759,093

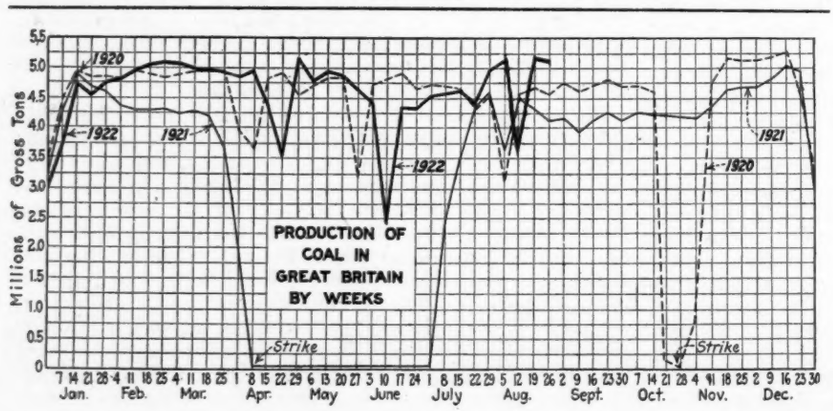
FRENCH EXPORTS IN JUNE

Coal	130,671	621,136
Coke	20,752	211,542
Briquets	2,038	49,299

Prices Drop at Hampton Roads

No change was apparent in the situation last week except a slight reduction in prices. The outlook has not improved much from any angle, dealers expecting another price increase soon. Ships were getting bunkers fairly regularly. Movement of coal to port was about 50 per cent of normal, with railroad equipment improving.

The spot market was being subjected to the natural frenzied activity, because of the scarcity of coal in spite of the downward market. All piers showed an activity similar to that of the previous week. Receipts are slowly gaining.



U. S. July Exports and Imports

(GROSS TONS)

	July 1921	July 1922
Exports, bituminous coal:		
By rail to:		
Canada	1,308,973	290,008
Mexico	14,499	6,415
Total	1,323,472	296,423
By vessel to:		
West Indies	14,270	8,079
Panama	18,149	7,025
Cuba	33,282	22,500
Total	65,701	37,604
France	110,648	.....
Italy	239,187	7,476
Netherlands	83,221	.....
Other Europe	32,246	.....
Total Europe	465,302	7,476
Argentine	97,512	7,576
Brazil	27,525	12,544
Chile	1,523	.....
Uruguay	24,333	.....
Total So. America	150,893	20,120
Egypt	36,904	.....
Other countries	607,627	4,664
Total bituminous exports	2,649,989	366,287
Total anthracite exports	388,641	16,698
Total coke exports	19,129	27,686
Imports, bituminous coal:		
Imported from:		
United Kingdom	.....	6,066
Canada	79,542	166,141
Japan	6,150	9,260
Australia	2,059	6,972
Other countries	8,449	1,501
Total bituminous imports	96,200	189,940
Total anthracite imports	357	4,263
Total coke imports	729	6,760

Pier and Bunker Prices, Gross Tons

PIERS

	Sept. 2	Sept. 9†
Pool 10, Philadelphia	$9.50@10.00	$9.25@$9.75
Pool 11, Philadelphia	8.75@ 9.00	8.50@ 8.75
Pool 10, New York	.....	9.00@ 9.25
Pool 11, New York	10.00@11.00	8.50@ 8.75
Pool 1, Hamp. Roads	8.00@ 9.50	8.50@ 8.75
Pools 5-6-7 Hamp.Rds.	8.00@ 9.50	8.50@ 8.75
Pool 2, Hamp. Rds.	8.00@ 9.50	8.50@ 8.75

BUNKERS

Pool 10, Philadelphia	$9.75@10.25	$9.50@10.00
Pool 11, Philadelphia	9.00@ 9.50	8.75@ 9.25
Pool 10, New York	.....	9.25@ 9.60
Pool 11, New York	10.30@11.30	8.75@ 9.25
Pool 1, Hamp. Rds.	8.00@ 9.50	8.50@ 8.75
Pool 2, Hamp. Rds.	8.00@ 9.50	8.50@ 8.75
Welsh, Gibraltar	40s. 6d. f.o.b.	40s. 6d. f.o.b.
Welsh, Rio de Janeiro	57s. 6d f.o.b.	57s. 6d. f.o.b.
Welsh, Lisbon	43s. f.o.b.	43s. f.o.b.
Welsh, La Plata	50s. f.o.b.	50s. f.o.b.
Welsh, Genoa	42s. t.i.b.	42s. t.i.b.
Welsh, Algiers	38s. f.o.b.	38s. f.o.b.
Welsh, Pernambuco	65s. f.o.b.	65s. f.o.b.
Welsh, Bahia	65s. f.o.b.	65s. f.o.b.
Welsh, Madeira	43s. f.a.s.	43s. f.a.s.
Welsh, Teneriffe	41s. f.a.s.	41s. f.a.s.
Welsh, Malta	44s. 6d. f.o.b.	44s. 6d. f.o.b.
Welsh, Las Palmas	41s. f.a.s.	41s. f.a.s.
Welsh, Naples	42s. f.o.b.	42s. f.o.b.
Welsh, Rosario	52s. 6d. f.o.b.	52s. 6d. f.o.b.
Welsh, Singapore	52s. 6d. t.i.b.	52s. 6d. t.i.b.
Welsh, Constantinople	50s. f.o.b.	50s. f.o.b.
Welsh, St. Michaels	50s. t.i.b.	50s. t.i.b.
Welsh, Alexandria	42s. f.o.b.	43s. f.o.b.
Welsh, Port Said	49s. f.o.b.	49s. f.o.b.
Welsh, Buenos Aires	50s. f.o.b.	50s. f.o.b.
Durham, Antwerp	30s. 6d. t.i.b.	30s. 6d. t.i.b.
Durham, Hamburg	26s. f.o.b.	26s. f.o.b.

Current Quotations British Coal f.o.b. Port, Gross Tons

Foreign Quotations by Cable to Coal Age

Cardiff:	Sept. 2	Sept. 9†
Admiralty, large	30s.@31s.	*29s.*
Steam, smalls	22s.@22s.6d.	*19s.*
Newcastle:		
Best steams	25s.@26s.	*24s.6d.@25s.*
Best gas	24s.	24s.
Best bunkers	23s.6d.@24s.	*21s. 6d.@22s.*

†Advances over previous week shown in **heavy type**; declines in *italics*.

North Atlantic

Will Consumer Seek Cover Or Gamble on Lower Prices?

Buying Is Spasmodic, Due to Wavering in Policy—Complaints Heard of Car Shortage, Especially on B. & O. —Few Orders for British Coal.

Many complaints of car shortage are heard. It is reported that conditions are especially bad on the B. & O. The effect of this lost time is not yet reflected in the larger markets, where heavier receipts have softened spot prices. Buying is spasmodic. Consumers appear to be floundering between a desire to get under cover and the temptation to delay purchases in the hope that prices will drop further.

Very few orders for British coals are being placed. Cargoes are arriving daily but the receipts are now mainly on old orders for railroads and public utilities. It is likely that deliveries against these orders will continue throughout the balance of the year.

PHILADELPHIA

Production grows, and better shipments are coming in, although not anywhere near normal yet. The real difficulty is car supply.

Service on the Pennsylvania is good, with a car supply up to 75 per cent and movement of loaded cars quite prompt. Much the same condition applies to shipments coming off the N. Y. C. and the Western Maryland. There does not seem any likelihood, however, of an improved car supply when it is considered that a great number of cars in the bituminous coal trade are fast being withdrawn for anthracite loadings. It is on the B. & O. where the real trouble is.

There is very little active solicitation by houses for orders, as every shipper already has far more orders on the books than he will be able to ship for several weeks.

Prices continue to fluctuate unevenly, with just a slight downward tendency, and while some houses report firmness or even a slight upturn in quotations, it is not believed that another forward movement has as yet developed.

Each day now sees the arrival of one or more cargoes of British coal, but it is not likely that any new business of consequence is being closed.

CENTRAL PENNSYLVANIA

Production is steadily increasing. The forces in most of the mines are being recruited to something near normal. Production is now running around 3,000 cars daily, something like 500 cars short of what is considered normal.

There are still some local strikes resulting from one cause or another, while the non-union operators do not, as a rule, have a full complement of men. Production for August was 33,129 cars, as compared with 14,079 in July.

Some operators, whose miners drifted away during the period of the strike, have not been able to get them all back again, so that it will be some time befor the normal output is reached.

BALTIMORE

An increasing volume of shipments have brought a decline in prices for steam and gas coals at this point. Demand, however, has prevented anything like a rush drop and there is now every indication that the present level is likely to be retained, at least for some weeks.

While there is practically no coal of Pools 1 or 71 now offering, and Pool 9 is also scarce in supply, good coals such as run to Pool 10 can be had at $5.50@$6. There is now considerable Pool 11 on the market, offering at $4.75@$5. As the market supply increases there is a let-up in the rush for any kind of coal offering. Gas coals are not changing hands as freely as steam varieties.

The above situation applies, despite the fact that the State survey conducted under the auspices of the Maryland Fuel Distribution Committee showed that a serious shortage of coal exists in nearly every section. It is probable, therefore, that the Maryland committee will be kept in service by Governor Ritchie for some time and that a representative will be named in each of the twenty-three counties to keep the committee informed so that it can act to secure coal in emergencies.

NEW YORK

There is no lack of coal at the local ports, 1,289 cars being reported on Sept. 8, although most of it is Pool 11 or coal of that quality. In addition there were small free tonnages of both British and Southern coals which were offered at higher quotations than coals regularly offered here.

Buying was spasmodic. There were many inquiries, some of them for contracts for the "balance of the coal year." As a rule the small operators practically ignored the latter, preferring to take chances in the open market. The operators with large tonnages, however, were reported to have negotiated several contracts, some of which it was said were at figures ranging $4@$4.75.

The matter of car supply is already entering into the situation. Most complaints so far heard refer to shipments along the B. & O. and Pennsylvania. Conditions on the New York Central and the Western Maryland are said to be much better.

British coal is still being purchased by American firms but in much smaller lots. During the six days ended Sept. 9, twenty vessels carrying 125,899 tons arrived in New York harbor. With production of domestic coals increasing it was reported there were some cancellations of British shipments. Shipping Board officials do not believe any of their charters will be canceled unless by agreement. Toward the end of the week a couple of cargoes of British anthracite were offered to local buyers at $11.50, this harbor.

Buyers are of the opinion that quotations will gradually become lower and for that reason are holding off.

UPPER POTOMAC

Upper Potomac mines continue to increase production, which is now not far short of 40,000 tons a week, with some of the larger companies contributing heavily to the aggregate output as more men return to work. There are still a good many miners on strike however, insisting upon a recognition of the union. Transportation facilities are ample. In the Georges Creek region idleness still prevails, although there is a report in circulation that ten companies have signed an agreement with the union.

FAIRMONT

Trouble has been experienced by mines in securing enough cars to keep running. Most of the mine owners in northern West Virginia have signed the union agreement, but in several sections mines are still being operated on an open-shop basis, as for instance on the Charleston Division of the B. & O.

West

KANSAS CITY

All of the mines in the Southwest are in operation and some of them are already putting out record tonnage. From now on it looks like a question transportation.

Some steam contracts have been closed at $3 for ¾-in. slack and purchasing agents are offering sales agents contracts at $2.50, but the opinion of the best-posted sales managers is that the price for steam coal will be higher and they are inclined to play the market.

One of the operating companies which has yards in Kansas City and other points is out with a new retail price list that is causing some concern, as this list cuts the price of some grades $2 and $3. Prices are well maintained at the mines and are as follows: Kansas lump and nut, $6; mine run, $5; slack, $2.50@$3.

SALT LAKE CITY

The announcement of an increase of $1 a ton, retail, has caused a storm to break throughout Utah. Individuals and business organizations are lifting up their voices and are trying to find ways to curb the upturn of prices. During the days when the increase was merely prophesied, a Salt Lake City newspaper and an operator got into a dispute over the justice of the prevailing price of coal, ending in a racket in which the coal man withdrew his advertising contract, whereupon the newspaper told the story in large space and announced it "could not be bought."

Car shortage is already serious in this region, although the I.C.C. has promised relief. Demand for all sorts of coal is increasing.

Anthracite

Resumption at Mines Hailed, But Sales Are Not Brisk

Consumers Seem Confident Substitute Will Be Available, When Necessary —British Coal Pressed Into Breach —Price Announcement by Companies Awaited.

The resumption of mining is welcome news to the householder. Dealers are advising their customers to procure enough substitute fuel to last through October at least, as they realize the distribution problem that confronts them. The consumer, however, feels that there will be little difficulty in obtaining a substitute at the last moment, if necessary, and sales are not brisk. Some British fuel is being taken in for this purpose.

Price is still an open question, no announcement having been made by the companies. A few independent quotations are heard.

NEW YORK

With unfilled orders sufficient to keep them busy for several months retail dealers are anxious to have the mines resume. Since the announcement that an agreement had been reached and that only approval by the miners' convention was needed to send workers back into the mines there has not been so much heard about substituting bituminous coal for anthracite. In many instances the customers have been advised to "hold off" as sufficient anthracite would be available to keep them at least warm.

Prices have received considerable attention the past week but so far no announcement has come from the producers' offices. It is not expected, however, that the companies will make any considerable change in the price list of last spring, but it is possible that with the heavy demand for hard coals the independent operators will be able to get premiums.

Some small lots of washery chestnut and pea were offered here during the week but retail dealers were not buying at the prices quoted, claiming they could not sell the coal to their regular customers at reasonable prices.

A few retail dealers in the outskirts of Greater New York have small tonnages of pea and chestnut on hand which they continue to deliver.

BALTIMORE

Some consuming interests are urging upon the governor the necessity of having his fuel commission name a representative to go to the fields and check up on the Maryland allotment. Governor Ritchie has not indicated whether he considers such a service necessary and it seems doubtful that such a step will be taken, especially as the committee would have no powers to enforce shipment.

Consumers are being advised that they should lay in supplies of bituminous coal, at least for the months of October and November. A number of dealers are now selling English coal which continues to arrive. Some of the dealers continue giving their customers demonstrations of the good burning qualities of this Welsh coal. The price now runs $13.50@$14.50, delivered in cellars.

PHILADELPHIA

With close to two weeks taken out of the month there is going to be very much of a scramble for the limited tonnage that can be produced during the balance of September. The consumer demand grows more insistent each day.

There is still a meager quantity of pea obtainable at $11 a ton, delivered, but the yards have no stocks now of this size.

As the early opening of the mines is assured, the matter of price is one of much interest. Of course the consumer has lost sight of this factor in a measure, being overshadowed by his desire to get coal, but the retail man is anxious to know what coal is going to cost him and what he will have to charge. One of the independent companies is reported as having already announced its prices, effective Sept. 1, as follows: Egg, stove and nut $9.25; pea, $7.50; buckwheat, $5, and rice $4.

There is some indication that the larger companies are intending to ship considerable coal to distant points, particularly the West. As it will take the mines some time to get up capacity production, they are apprehensive that they will have a long wait before receiving fuel in any generous quantity here.

River barley is fast losing its market, as the better receipts of soft coal are displacing it. Prices are $1.75@$2.50, the latter figure demanded for fuel almost entirely free of pebbles, and with light sales made.

BOSTON

Dealers realize there is but a few short weeks to the time when fuel will be in urgent demand, and as yet, except in the direction of bituminous coal, they are helpless to give any real relief. Most anxiously are they looking forward to the first shipments of prepared sizes. Meanwhile, there are but extremely few stray cargoes of pea that come forward.

Pea is selling for $15 per net ton delivered in Boston at retail. One of the newspapers here inquires why the retail dealer does not give the consumer the benefit of the July 1 reduction of 10 per cent in railroad tolls. And the volunteer fuel committees on the same day insist that no more than one ton shall be delivered to a consumer.

BUFFALO

The public looks for coal in some quantity soon, though the agreement to resume mining is not fully ratified. The amount of coal held over is quite large here. The prospect of gas is good, both on account of the increased amount of byproduct, and the natural supply which is expected to be good.

Shippers and distributors are trying to keep consumers reassured by calling attention to the fact that we have had strikes and shortages before and yet there was coal enough. As to what the price will be nobody is able to speak with authority, although one shipping agent ventures the opinion that the reduction in freights, amounting to about 36c. a ton, will be absorbed by the companies. He does not look to any material change in prices.

ANTHRACITE FIELDS

In spite of considerable opposition, John L. Lewis last week secured the ratification of the contract negotiated by the scale committee. It is expected that production will reach a high figure by the end of this week. The men will all be in as soon as the mines, which are somewhat out of repair, have been placed in shape for operation.

The companies are estimated to have rush orders for at least 20,000,000 tons. Little or no coal will be mined during the early part of this week, and no more than 1,500,000 tons the week following.

The resumption had an immediate effect on the market for river barley, which had already been showed by the heavier use of bituminous coal.

South

BIRMINGHAM

Although inquiry is somewhat more restricted in scope than it has been, spot demand is still good and in excess of the supply. Priority consumers are getting the first call and the requirements of non-essential industries are not so well taken care of.

Market conditions are becoming more stable with the receding pressure from outside territory and prices seem to be settling around the schedule fixed by the State Fuel Administrator, effective Sept. 1. The allowed mine prices are as follows:

	Mine Run	Washed	Lump or Nut
Carbon Hill	$3.00	$3.50	$4.45
Cahaba	3.60	4.10	5.20
Black Creek	3.60	4.10	5.20
Pratt	3.00	3.50	4.45
Corona	3.00	3.50	4.45
Big Seam	2.60	3.10	3.45
Montevallo	4.00	....	6.00

Domestic coal under contract f.o.b. mines for September ranges $2.75 for Big Seam to $4 for Cahaba.

Railroad service is very inadequate and much time being lost account of car shortage. Slow movement is keeping a large number of cars under load an excessive period. Production for the week of Aug. 26 was approximately 380,000 net tons.

VIRGINIA

Production is gaining slightly, the increase being most marked in that section of the field which during the period ended Aug. 26 was the most affected. Transportation conditions have been somewhat improved. Production losses are to be attributed entirely to a car shortage.

Chicago and Midwest

Car Shortage Handicaps All Midwestern Fields

Illinois and Indiana Drop below 30 Per Cent Production Because Roads Can't Handle Output—Quotations on Domestic Sizes Rise.

Illinois and Indiana fields started off the past week with a fair car supply, following Sunday and Labor Day, but by the end of the week the lack of power had put the production of those states down below 30 per cent and Kentucky was in the same fix. Demand generally continued light, however, so that the only coal to feel any buoyant price tendency was southern Illinois lump, which climbed about 50c.

There was nothing going on to cause any upset beyond a little flurry in Chicago against the I.C.C. supplemental order giving domestic shipments priority over steam. In the Kentucky fields more attention is being given to Lake trade, since much Western business has been lost to other fields.

ST. LOUIS

An unusual quietness for this period prevails in that domestic trade is slow and steam is not as active as it should be normally. Domestic buyers seem to think that something will happen that will reduce the price though there is a shortage of Carterville that cannot be made up.

Generally speaking, things are easy and quiet. The extremely warm weather has prevented heavy deliveries of domestic and the domestic business in the country is reported to be in a somewhat similar condition. Country steam is quiet, with practically no storage going on. The same condition holds in St. Louis. The past week the dealers raised the price of Carterville from $8.50 to $9, sidewalk delivery. No anthracite, smokeless or Arkansas coals are coming in and the supply of coke is limited.

CHICAGO

The decided handicap or car shortage in all Illinois and Indiana coal fields has so reduced production that the light demand on this market has been met with a comparatively light supply. The expected pick-up in both domestic and steam has not materialized with any speed although domestic call may have been responsible in part for the hike in quotations on southern Illinois prepared sizes from $5 to $5.25@$5.50 along toward the end of the week. This was about the only change in the circular on any coal coming into this market. The general tendency is slightly upward, however, and coal men are predicting the tendency will be more marked next week when the hot spell has passed.

For several days there has been a dragging influence making itself felt here. A good many odd lots of steam coal have been shipped in on consignment and unloaded at prices that verged close to the red. Occasionally these deals were made $3.50@$3.75 for screenings when the market wavered around $4.25. The fact that domestic sizes are to have priority in shipments hereafter may end this sort of thing though big buyers are still hoping for a marked drop in all steam sizes.

Practically no coal from states east or south of Indiana is reaching here nowadays. Kentucky is as hard hit as Illinois and Indiana by the transportation difficulty and all Eastern coals are absorbed elsewhere or cannot penetrate the various railroad congestions.

INDIANAPOLIS

The Indiana Coal Committee left the price of coal to the operators' consciences and the price ranges $4@$4.50 at the mines with the accent on the latter price. The termination of the strike has not relieved the fuel situation in the state. Few retail dealers are doing any business. Quotations from the dealers show prices to be about $2 a ton higher than at the same time last year. A number of dealers have been unable to secure coal.

No substantial orders are being placed and operators say when winter comes there will be a mad scramble. At the present time the delivery end of the coal situation is the big problem. The mines in Indiana can produce the coal, but the railroads are falling down miserably in making deliveries. During the past week there have been no changes in prices of coal from outside the state.

LOUISVILLE

It is the general belief of the local coal trade that other than some big tonnage movement to the Lakes, there will not be much priority regulation of any kind after a few more days. Some operators are having a little trouble, it is reported, in finding buyers at the market price. Demand for prepared sizes is steadily increasing, but operators would rather load mine run.

With the present price range all the way from $3.75 for western Kentucky screenings, to $6.50 for best eastern Kentucky lump, there does not appear to be much prospect that Washington will have very much to say for the time being about prices, although mine run is selling all the way from $4 to $5.75 at the mines, not including brokerage. Some reports have been received of $7.50-coal in West Virginia and Kentucky, but $6 is about as high as is being bid for anything here with $6.50 asked, some lump selling at that.

Until eastern Kentucky moves considerable Lake tonnage—mostly mine run—there is not much prospect of any large production of prepared sizes in the districts that are handling this business. As a whole the general situation is much better. No real shortage of coal is being heard of, no plants are closing down, and movement is generally better, with the market steadier all along the line.

WESTERN KENTUCKY

The present small car supply in western Kentucky—said to be 33 to 40 per cent on L. & N. lines, and about 65 to 75 per cent on the lines of the Illinois Central—is preventing any overproduction which would tend to weaken prices. Priority orders are still in effect. This is holding down the amount of coal moving on open shipments. Operators are finding some trouble in moving their output unless they have priority orders.

There is better demand for prepared sizes, but operators are not willing to make much lump coal because they feel that cars are too scarce, and they would much prefer shipping mine run at a lower price, than to hold cars overnight on tipple switches partly loaded.

It is rumored that about 100,000 tons of coal from western Kentucky is in prospect for movement to the Great Lakes. The supply moving from other fields to the Lakes is small.

While western Kentucky mine run has not been plentiful at any price under $4.25, there has been some available. Jobbers have been trying to find lump at $4.75, but supplies are scarce. Screenings are quoted as low as $3.75 a ton, and prospects are for lower steam prices.

Some of the operators now need business, and are calling jobbers every evening in order to sell the day's production, as buyers are not nearly as plentiful in the field as they were, since Chicago dropped out as the dominating influence in the market.

SOUTHERN ILLINOIS

The situation is disappointing to operators and miners alike on account of the car shortage. The average working time is only a little better than three days a week in the Carterville field on account of no cars. The railroad tonnage is light and the domestic demand seems heavier than usual. Steam sizes are not active. There is nothing unusual going on in the southern end of the state except that the miners are watching closely the investigation of the Herrin massacre at Marion.

Somewhat similar conditions prevail in the Duquoin field, though some mines that have not opened up as yet are getting ready to do so. Prices in these districts range $4.90@$5.25 on domestic sizes and $3.50@$3.65 on screenings and mine run. Mt. Olive conditions are quiet, with a good tonnage moving to the Chicago and Northwestern markets.

In the Standard field a peculiar condition exists, where some coal is sold as low as $3.25 for domestic 2-in. lump, while others are asking as high as $4.50 for the same grade of coal. Standard mine run sold to one of the railroads last week, about 100 cars open market, at $2.25 and it is understood that a lower price will be made on contract. It is a peculiar market, with no way of determining just what the value of coal is.

Eastern Inland

Demand Slackens as Prices Fall and Receipts Mount

Scrambling Buyers of Recent Weeks Now Rely on Stocks—Car Shortage Increasing—Empties Return Slowly —Movement to Lower Lake Ports Gaining.

Larger receipts have softened spot prices. Consumers who recently scrambled for tonnage at any price are now using this supply and are not buying. It is the old story of curtailed demand on a falling market. Car shortage losses are growing rapidly and there is no doubt that production has about absorbed all the serviceable cars that were idle when the union mines resumed work. A slower return of empties is now noticeable.

Lake buyers are anxious to obtain coal but fail to place orders when the faintest sign of price advance appears. The movement to the lower ports has been aided through priorities, and the 1,000,000-ton per week goal is nearing.

COLUMBUS

The Ohio coal trade is in a peculiar condition. While domestic demand is keen there is not as much strength to the steam market as might be expected under the circumstances. Public utilities, and all institutions are pretty well supplied and general steam users are holding off for lower quotations.

Retailers are selling a fair amount to householders, but as is the case with steam users, many of the domestic consumers are waiting for lower prices. Retailers are selling Hocking and Pomeroy lump around $9.50@$10, while West Virginia grades are somewhat higher. Only a limited amount of smokeless and other grades from West Virginia is coming into the market.

Lake shippers are anxious for tonnage but prices are too high and they are loath to close contracts. Offerings at $5@$5.50 have not attracted shippers to any great extent and the tendency is to hold off to see what happens. Operators with their own dock connections are shipping coal and the various Lake docks are handling a fair tonnage.

DETROIT

While extremely hot weather is dispelling from the minds of domestic consumers any thought of winter fuel requirements, the condition of unsatisfactory supply is developing a situation that cannot fail to make trouble for many later in the year.

There is very little steam inquiry. While the amount of free coal is not great, it is possible to find a few cars when demand develops. Most of the coal now reaching Detroit, is the product of union mines in Ohio and prices range $6@$6.25 for slack or mine run.

With practically no anthracite in retail yards, the outlook for household consumers in Detroit is far from encouraging. Many of the homes are equipped with heating plants unsuited to using bituminous coal. The supply of coke is scarce and retail prices have been advanced from $12@$12.50 to $13@$14.50, or approximately three times the pre-war cost.

CLEVELAND

Sharply increased production is being reflected in larger supplies of fuel in this section and consequently lower prices and a much less active market. Coal is now available in ample quantities at $5.25@$5.75, the average for the past few days being about $5.50. Buyers who were scrambling to get fuel a few weeks ago at any price are now following a policy of using up their stocks before going into the market again.

While the present price looks good compared with that prevailing recently, it is the old story of curtailed demand upon a falling market. Consumers have not forgotten the $3 level prevailing before the strike. Operators, however, point out that railroad equipment is bad on some lines and distribution may become more and more hampered as the season advances and the strain upon the roads grows heavier.

The Lake movement is being successfully expedited through priorities. Shipments now approach the 1,000,000-ton weekly goal. Officials of the Ore & Coal Exchange, however, do not believe that it will be possible to move more than 10,000,000 tons between Sept. 1 and the close of the season. This will give the Northwest about 15,000,000 tons in all.

EASTERN OHIO

Notwithstanding a car supply of only 35 to 40 per cent on the B. & O. and W. & L. E. production during the week ended Sept. 2 was increased 21,000 tons over the preceding week. Total output was 288,000 tons as against a potential capacity of 620,000 tons, or 46 per cent of normal. Only 6,006,000 tons have been produced out of a potential capacity of 21,120,000 tons for the year.

While there is a ready market for all coal offered for sale at this time, inquiries are not numerous and no anxiety appears on the part of steam users to take care of anything more than immediate requirements. Spot prices have softened somewhat during the week, quotations ranging 25c.@40c. lower than those obtainable a week ago.

Receipts at Cleveland during the week ended Sept. 2 registered a decrease of 50 cars under the quantity received during the preceding week. Total arrivals amounted to 764 cars, 651 for industries and 113 for retail yards. The decrease at industrial centers is accounted for by the failure of non-union coals from West Virginia and eastern Kentucky to get through the blockade at Ohio River gateways and also procrastination on the part of buyers, who anticipate that as production is speeded up, prices will be lower.

PITTSBURGH

Although the Pittsburgh Coal Co. signed the wage scale a day after its resignation from the Pittsburgh Coal Producers' Association, the remaining members of the association having then signed, it is understood that the resignation has not been withdrawn.

Resumption of mining has been fairly rapid. There has been no scarcity of cars, but the loadings thus far are no certain criterion as to the future, because many of the cars being loaded are cars that have long been idle. The real test of transportation capacity will be furnished in the attempt to bring cars back for their second and subsequent loadings. Already reports are accumulating of large numbers of loaded cars lying near mines.

The first regular business in Pittsburgh district coal was in Youghiogheny gas, nearly a fortnight ago, the price being $6.50. Now there is an open market in steam and byproduct also, and the trend in prices has been downward. Pittsburgh steam mine run is quotable at $4.50@$4.75, and fair grades of gas mine run, $4.75@$5. Connellsville steam is held at $4.50 but is not meeting a ready sale. Connellsville byproduct is at about $5@$5.25 but there is not much movement as offerings are light.

BUFFALO

The market is not brisk, for the consumer now looks on the supply as sure to be adequate with a possibility of lower prices. Cars are already running down, however, and a shortage always means stiff prices.

At the same time consumers are pretty well supplied and they will not feel the need of much more right away. They are enjoying a reduction of $2 or more from the strike prices, though the suggested bottom price of $3.50 did not appear.

The prospective return to anthracite mining tends to further ease off the stress, but if it cuts into the car supply, as it likely will, the soft coal supply will be sure to run down. Prices are steadying down some, with a fair quotation, mine price, of $6 for Youghiogheny gas slack, $5.50 for Pittsburgh ⅜-in., $5.25 for mine run and $5 for slack, with Allegheny Valley mine run at $5@$5.25.

Vessels are paying $8.50 for ¾-in. loaded on board. There is a small spurt of soft coal from Ohio ports this way, but it will be light till cars are more plentiful. August receipts were only 35,900 tons. For the season the amount is 869,310 tons.

NORTHERN PANHANDLE

With union mines again producing and open-shop mines also running at the usual rate, production is again being increased, but has not reached normal proportions as the railroads are not supplying all the empties needed. Much of the output is being secured by the railroads and a large proportion is going to the Lakes.

Northwest

Lake Vessels Once More Begin to Deliver Coal

But Demand Keeps Docks Empty—Prices Are Stiffening—Doubtful Quality Is Blamed on Pooling Plan at Lower Lake Ports.

While the flow of coal by Lake has shown signs of strengthening considerably the demand for coal is so keen that the docks are emptied as fast as vessels dump. The country trade is hungry for fuel and is grudgingly buying it at the prevailing high price rather than take a chance of getting caught short later on. There is little chance of anybody loading up too heavily this year.

Altogether the Northwest feels that its loud wail of recent weeks has not won much compassion from the rest of the country but that, now that coal is slowly coming in, there surely will be enough unless the car shortage down in the mining fields shuts off the supply. A good deal of dirt in cargo coal draws condemnation for the Lake pool.

MINNEAPOLIS

While fuel commissioners are working tooth and nail to get an adequate supply of coal on the docks for the coming winter, they are finding the reception accorded them and their wants rather indifferent. Producers are not much inclined to go out of their way at all to help out the Northwest. Since prices at the mines are higher than the Northwest wants to pay, purchases for this region are not as heavy as they might be. Even the effort to get all-rail coal from Illinois and Indiana is not lively and car shortage interferes with that source of supply also. As the situation stands now coal is on its way up with quotations especially high for immediate delivery.

There is serious consideration of rationing fuel and of reducing consumption by cutting off unnecessary street and window lighting and other places where economy might be practiced to avert a fuel shortage.

MILWAUKEE

The coal stress has been eased to some extent by the arrival of a number of cargoes of soft coal. All sizes of Pocahontas and the popular grades of steam coal are now obtainable in reasonable quantities, "while they last," at the prices fixed on the first of the month.

However, this temporary relief does not allay the anxiety regarding future supply, and it is freely admitted that the fuel problem will be the worst that Milwaukee has ever confronted, unless the railroad situation improves soon. No so-called priority coal has been received at Milwaukee as yet.

The coal cargoes which have been delivered of late were bought at the mines at premium prices. Eight cargoes have been received since last week's report. One cargo of 6,500 tons was credited to the month of August, increasing the total for that month to 78,852 tons. September receipts thus far aggregate 38,500 tons, making the total for the season to date 852,912 tons, against 1,892,865 tons during the same period last year. Last season's receipts of anthracite to date aggregated 666,630 tons.

Following is a revised price schedule of soft coal for steaming purposes:

	Wholesale	Retail
Pitts., Hock., & Yough., screened	$10.25	$11.75
Pile run	9.75	.....
Screenings	9.75	.....
W. Va., screened	10.25	11.75
Pile run	9.75	.....
Screenings	9.75	.....
Poca., screened	12.00	13.50
Mine Run	9.75	11.25
Screenings	9.75	.....
Smithing	10.75	12.25
Ill. & Ind., screened	10.25	11.75
Pile run	9.75	.....
Screenings	9.75	.....

Coke now sells at $16 for the large sizes, and $13 for small sizes.

DULUTH

Receipts for August at Duluth—Superior harbor were far below the average, according to announcement made by official weighing bureaus here, aggregating but 95,802 tons, of which 9,000 tons were hard and 85,802 soft. August receipts last year aggregated 492,012 tons—25,512 soft and 466,500 hard.

Despite the fact that the Northwest has been in desperate condition for coal, reports show that 5,000 tons were shipped from this port to Lake Michigan ports in the past months. This brings the total of down-shipments for the year to 224,500 tons.

Since the first of the month nine ships have arrived in port and eight more are scheduled to arrive soon. Shipments from the docks for August were 20,373 cars. This seems to indicate that the dealers throughout the territory served are willing to get their coal in immediately and that there will be no tie-up on the docks to hinder arrivals.

An increase in price has taken place. Hocking lump is quoted at $12, run of pile at $11.50, and screenings at $9.50.

Elkhorn, which is scheduled to arrive this week will be $1 higher than this, dock men say. One five-car lot of Illinois coal has been received, at $5.50 at the mine.

New England

Save for Heavier Receipts By Water, Market Is Quite

Quotations Erratic on Fuel Bound Inland—Buying Scattered, Consumers Relying on Accumulations—Outlook for Shippers Not Roseate with Promise for Next 60 Days.

Except for largely increased receipts by water, the market here continues extremely quiet. Quotations on cars for Inland delivery are more or less erratic, prices ranging $10@$11.50 per gross ton. There is only scattered buying, however, and consumers for the most part are resting easy on coal they accumulated weeks or months ago, as the case may have been.

From present appearances the various shippers are likely to get little support from this territory the next sixty days or so, and while some factors are whistling to keep up their courage we see little chance of any comprehensive market for any of the steam grades.

A depressing factor is the very large tonnage of British coal that is continually arriving. During August receipts from this source alone were 265,000 tons, and according to figures at the Boston Customs House 547,511 tons have been entered from the British Isles and from Cape Breton since June 1. It is understood that in addition to twenty-two steamers now in the harbor awaiting berth there are upward of twenty-five due within the next few days. Most of this coal was sold before loaded and is being taken in by railroads, utilities, and certain other large concerns who purchased it some weeks ago. A proportion of it, however, was sold to large retail dealers and other factors who are now trying hard to unload. This coal has been quoted recently at from $9.00 alongside down to $7.50 and less, and when demurrage charges are considered there must be some very heavy shrinkages on the part of some who undertook the shipment.

Hampton Roads spot prices have eased off to $8.25@$8.50, these being 25c.@50c. over the Hoover "fair basis." While in some instances, due to an accumulation of boats when priorities were in effect, there have been delays in loading, recent reports show a considerable surplus of coal over bottoms waiting, as compared with a small deficit a week ago. Spot demand is very quiet.

Several Pennsylvania shippers are making the effort to place screened coal to be used as substitute for anthracite. Quotations have been made all the way from $6.75 up to $8.75. but retail dealers feel the public is not yet at a point where it will pay for these coals a price higher than anthracite was selling for in the spring. High rail rates to Eastern points make the highest priced screened coal seem prohibitive.

Cincinnati Gateway

Strike of Coal Buyers Makes Its Appearance

Lake and Domestic Purchasers Missing From Market When Hoover Prices Fail to Hold—Heavier Output Handled Without Undue Congestion.

A coal buyers' strike, sporadic but of definite proportions has made its appearance in the Cincinnati market. Some weeks ago, Lake buyers, in the hope that the government price would hold, attempted to get values down to the Hoover level, less the commission. Now that the Hoover prices have gone by the boards they are playing another game. As soon as prices take an upturn the Lake buyers are strangely missing from the market. Coal that was offered at $5.50 was bought while $5.75 asked in other quarters was turned down.

Heavier production has so far been handled by the carriers without any additional congestion. Cars are becoming scarcer, however, and during the past week these losses have been mounting. Prices are stronger, high-volatiles leading the smokeless coals.

HIGH-VOLATILE FIELDS

Kanawha

Strike trouble prevents the railroads from furnishing enough cars to keep the mines going more than two or three days a week and the increased number of mines in operation tends to reduce the number of cars available. In the strike zone—that is where there has been no union agreement—there are more mines at work. Much of the product has been moving at the Hoover price plus 8 per cent but some coal has been sold within the last few days at $5.50.

Logan and Thacker

Logan mines during the week ended Sept. 2 appeared to be harder hit by a shortage of cars than the plants in any other high-volatile field, the supply at times dropping as low as 300 cars a day. Limited operation made it almost impossible to take care of contract customers and to comply with priority instructions for Lake movement.

Kenova-Thacker mines are beginning to recover after a fashion from the effects of a car shortage which materially curtailed production. Of the tonnage moved Westward a fairly large volume was for Lake points.

Northeastern Kentucky

Owing to large production elsewhere there is not so strong a pressure for fuel in northeast Kentucky as there was a short time ago. Consequently prices are on a somewhat lower level, the range being $4.50 @ 5.50. There is a better demand for gas coal than for other kinds of fuel.

LOW-VOLATILE FIELDS

New River and the Gulf

Although transportation conditions are undergoing improvement in the New River field, mines are still limited to about half of capacity. Car shortage is chiefly responsible for limited production, most of the miners being at work notwithstanding the fact that the mines are operated on an open-shop basis.

Gulf mines have been able to speed up production to some extent owing to an improvement in transportation facilities furnished by the Virginian and the C. & O. but car service is still far short of normal. It is now possible to move more coal to Tide.

Pocahontas and Tug River

Pocahontas mines are once again finding it possible not only to speed up production but to hang up some new records, at least at intervals, Monday, Aug. 26 being a red-letter day, when 80,000 tons were loaded. The most pronounced movement was to Western points, to which little Pocahontas fuel has been moving recently, owing to embargos. Although spot prices have undergone a marked decrease the average is about $4.50, the figure at which the bulk of the coal has been moving in recent months.

In common with the Pocahontas field, Tug River has found it possible to increase production in view of improved transportation facilities. The Western gateway was not so congested so that it was possible to move more coal to Western markets and particularly to steel and byproduct plants. With production much increased a labor shortage is beginning to develop again. Even with the larger output there is comparatively little coal available for the open market.

CINCINNATI

Lump coal has gone soaring, $8 being asked in some quarters without the bat of an eye, this because most of the output is now on a straight mine run basis. The result is that the takers of domestic coal are buying only as their absolute needs require, hoping for the turn of the market to lower levels. Still other concerns are taking another course. Instead of going after coal of high grade and efficiency they are taking off-grades that can always be picked up from 50c.@75c. a ton below the market, hoping that in this way they will be able to get action toward a lower level.

One fact is outstanding and that is that the smokeless operators and sales agents, while they moved prices upward with the removal of the Hoover restrictions, they are holding these way below that of the high-volatiles, comparatively.

The movement of two days a week from the Pocahontas fields has been working a hardship that could be avoided if there were a set time for this instead of the coal being taken under the tipples on the days that the railroad people decide.

The retail price adjustment made last week still holds. Even though there has been a general advance $11 is still top for Pocahontas lump, with $8.75 for mine run; $9 is top for bituminous lump, with $6.75@$7.50 for the slack.

Coke

UNIONTOWN

The Connellsville coke region will remain the greatest non-union field in the country but only a portion of the miners who went on strike April 1 will remain to accept open-shop conditions. A great labor turn-over is taking place in this district. Miners who became thoroughly imbued with union principles are leaving this field for those working under the Cleveland agreement and their places are being taken by miners from other fields.

Increased production by imported workers has further been followed up by operators by a general increase in the number of evictions. Since the strike became effective a total of 3,500 miners have been evicted and it is declared to be the policy of operators to claim possession of every company house before cold weather arrives.

The coal market for the time being seems to have been stabilized at $4.50 @$5. There are an abundance of orders but consumers are disposed to balk at higher prices.

CONNELLSVILLE

Statements that a car shortage has definitely developed are premature, but the condition is much the same as if a shortage were actually visible, since the limit of possibility in furnishing cars has evidently been reached. It is plain that no material increase in shipments can occur with transportation conditions as they are practically certain to be in the next few weeks. In other words, the strike is not really the dominant factor in the situation.

The strike continues with remarkable perseverance. Since the posting of the high wage scale, some men have drifted back to work, but the drift has been no greater than formerly. The operators have various reasons for not signing, but apart from these reasons the ending of the strike on account of transportation conditions, would not materially increase the shipments.

Furnace coke has softened a trifle in the week, being now quotable at $11 @$11.50, but the total offerings would probably be insufficient to run a single blast furnace, so that the market is fictitious as regards transactions between operators and blast furnaces. The coke offered goes to miscellaneous consumers, in small lots. Foundry coke is off about 50c., at $12.50@$13.

The *Courier* reports production during the week ended Sept. 2 at 73,810 tons by the furnace ovens, and 16,490 tons by the merchant ovens, a total of 90,300 tons, an increase of 4,200 tons.

BUFFALO

The situation in the Connellsville district does not appear to be clearing up as fast as it is elsewhere, so that the coke ovens are not starting up as they otherwise would. Demand is not active yet and it may not be if the local byproduct ovens start going regularly soon.

News Items From Field and Trade

ILLINOIS

Coal mines in seven states closed for one day on Aug. 29, out of respect for the memory of **Francis S. Peabody** who was buried at Hinsdale, near Chicago, after five o'clock services that evening. The mines closed were those owned or operated by the Peabody Coal Co., of which Mr. Peabody was chairman of the board. Mr. Peabody died suddenly of heart disease on the Sunday preceding. Pallbearers at the funeral were George F. Goetz, Frederick W. Upham, C. D. Caldwell, C. J. Gray, Henry Hooper, Jr., M. F. Peltier, Garrard B. Winston and George W Reed.

A contract by which the **Southern Gem Coal Corporation**, of Chicago, will lease for twenty-five years from the **Willis Coal and Mining Co.**, of St. Louis, 7,000 surface acres of two-vein coal property in Perry and Randolph Counties, for which negotiations began six months ago, was completed with the end of the coal strike in Illinois. The Chicago concern agreed to mine a minimum of 19,000,000 tons in the period of the lease. The property includes two mines, and the lessor contracted to open a new 5,000-ton shaft.

Charging Illinois operators with unnecessarily increasing prices of coal to the public, Freeman Thompson, a union official at Springfield, is filing a petition for a court injunction to prevent operators from charging more for coal than they did last winter. Miners' wages are the same, Thompson argues, therefore the cost of coal to the public should be the same.

The following September itinerary of the **Illinois Miners' Examining Board** has been announced by State Director Robert M. Medill, of the Department of Mines and Minerals: Collinsville, Sept. 5; Harrisburg, Sept. 6; Herrin, Sept. 7; West Frankfort, Sept. 8; Du Quoin, Sept. 9; Staunton, Sept. 11; Hillsboro, Sept. 12; Springfield, Sept. 13; Decatur, Sept. 14; Danville, Sept. 15; Canton, Sept. 16; Peoria, Sept. 17, and La Salle, Sept. 19.

A. J. Halle, of Minneapolis, Minn., has been named district manager of the **Peabody Coal Co.** for central Illinois, with headquarters in Springfield. He succeeds **W. B. Jesse.**

E. P. Stiehl, New Baden, Clarence and Sherman Stiehl, Belleville, have purchased the interests of Frank Patterson in the **Patterson & Harding Coal Co.**, operating a mine on the Mascoutah road a few miles out of Belleville. Enos G. Harding retains his interest in the mine.

The Ellisville Coal Mining Co. has been incorporated with capital of $30,000 by William Donaldson, A. B. Donaldson and W. R. Hawkins.

Harry Weeks, sales manager for the newly formed Howe-Coulter Coal Co., which has operations in Indiana and offices in Chicago, is returning to business after a summer's vacation.

The Springside Coal Co. of Pana has been incorporated with capital of $25,000 by Lyle H. Dayhoff, John J. Sherlock, Silas A. Shafer and L. Y. Shafer.

INDIANA

An organization meeting of the **Seventh Vein Coal Co.** was held in Terre Haute recently at which plans for the operation of a mine owned by the Shirkie interests and located in Sullivan County were made. The mine is the only one that the newly-formed company contemplates taking over now. The mine has not been operated for about a year and a half. The new company has a capital stock of $75,000 and the organizers are Clement J. Richards, F. J. Crawford, S. D. Royce and R. A. Darmody.

One case set for trial in the September term of the circuit court at Brazil is the State against Dave Jones, one of the officials of the Eleventh District, U. M. W., and others, in which some 90 coal miners are defendants charged with riot. The cases grew out of a riot during the recent strike when miners sought to close the strip mines and wagon mines. Sixty of the defendants were arrested and gave bond and the others escaped from the scene of activity.

Two of the oldest corporations dealing in coal, both wholesale and retail, and building materials in Indianapolis, the **Indianapolis Mortar & Fuel Co.**, and **A. B. Meyer & Co.**, have been consolidated into one company, the **Allied Coal & Material Co.** Articles of incorporation have been filed with $1,000,000 capital stock. The consolidation creates probably the largest company of its kind in Indiana.

MASSACHUSETTS

The New England Coal Co., of Waltham, formerly conducted by Pryor Fulton, has been incorporated to engage in the general coal business. The capital stock is $50,000 and the incorporators include Pryor Fulton and Robert W. Hill.

MINNESOTA

The Inland Coal & Dock Co. has completed a 2,000x500-ft. extension to its dock at Duluth-Superior harbor. This will greatly increase the company's storage space and will help prevent future overcrowding of the docks.

MISSOURI

Efforts that were made to extend an old well on a farm near Harrisonville into a shaft on a lease that **Dr. C. C. Van Hall**, of St. Joseph, has secured proved a failure because mine damp stopped the workers. A permanent shaft is now to be sunk about 1,000 or 1,200 ft. from the site of the well. Dr. Van Hall also has secured a lease on a tract of land owned by John C. Beatty, near Harrisonville, and will develop it, the coal to be secured from this tract by means of stripping.

The Lou Nash Coal & Mining Co., capitalized in Illinois for $60,000, has been incorporated to do business in Missouri, with headquarters in St. Louis. The incorporators are: R. B. Clark, H. S. Kramer and R. V. Clark.

NEW YORK

Anthony Grasso, formerly with Witney & Kemmerer, has taken the Buffalo agency, just formed, of the Valley Coal Co., of DuBois, Pa., with office in the new Lafayette Bldg.

OHIO

A widely circulated report that **J. A. Hicks** manager of the **Colter Canning Co.**, Amelia, was paying $26 a ton for coal was denied by Mr. Hicks. No less than a half dozen reputable coal men offered him all he wanted around $5. Even though a stenographic report was made of one conversation the newspaper that gave rise to the story refused to print the truth.

The coal buyers for the big steel corporations of Youngstown and Pittsburgh who have had headquarters in Cincinnati for the past three months have moved out. **R. B. Stump**, who was here for the Lackawanna Steel Co., was among the last to leave.

Recent visitors to the Cincinnati market were **Holly Stover**, of Chicago, who stopped over while en route from his mines in West Virginia; **T. E. Mahan** of the Mahan-Jellico Coal Co., of Williamsburg, Ky.; **S. R. Jennings** of the Hazard-Blue Grass Coal Co., Johnston City, Tenn.; **Abner Lunsford** of the Banner Fork Coal Co., Hazard, Ky., and **I. Vass**, sales agent for the W. R. Deagens Coal Co., with headquarters at Huntington.

The Maher Collieries Co. is reported to have purchased a large number of portable houses at Nitro, W. Va., which were erected by the government when it had a munitions plant there during the war. These houses will be erected for the men employed in the company's mines at Glencoe, Maynard and Stewartsville. They contain four rooms each and can be made ready for occupancy near the mines at an approximate cost of about $1,000 to $1,200 each.

David H. Gay, of the Big Run Coal Co., of Winchester, Ky., was in Cincinnati recently for a few days. He claims to be the prize hard-luck operator of eastern Kentucky. When business was at its best a local strike shut his company off for over two months.

PENNSYLVANIA

The Freeport seam operators signed the Cleveland agreement on Aug. 28 and resumed operation the day following. Among the companies affected is the **Inland Collieries Co.**, at Indianola. Although the company men worked hard to maintain the mine in fair condition during the strike, little could be done by way of clean-ups of fallen rock in this mine where the roof is of a nature to break down readily as in all mines working the Freeport seam. Working against such odds, a full quota of miners was sent into the mine and three days later 1,200 tons were hoisted in addition to large quantities of rock. This mine was closed down for a period of ten and one-half months.

The Peabody Coal Co., Chicago, has taken over the production end of the **Northwestern Mining Co.**, which includes the plants in the Toby Valley in the DuBois section and the Tioga fields.

The Carnegie Steel Co. has awarded the Koppers Company a contract covering a big extension to the present by-product coke plant at Clairton, already the largest of its kind in the world. This extension will consist of 366 by-product coke ovens, a benzol motor fuel recovery plant and by-product plant. This will bring the number of ovens at Clairton up to a total of 1,134, with a carbonizing capacity of 21,500 tons of coal per day.

Bituminous coal companies recently incorporated at Harrisburg were: **H-K Colliery Co.**, Clearfield, capital $25,000; treasurer, James P. O'Laughlin, Clearfield. Purpose, mining, quarrying and selling coal. Incorporators: Harry Halden, Clearfield; Edward T. Kelley, Clearfield, and Delia Beahan, Clearfield. **Rogers Mining Co.**, Jefferson, $20,000; E. R. Spengler, Pittsburgh. Purpose, mining and quarrying bituminous coal. Incorporators: N. P. Rogers, Jefferson; T. M. Jones, Pittsburgh, and E. R. Spengler.

Again reports come from Pittsburgh of the coal merger, this time with more detail than before. The following companies are involved according to one report: John A. Bell interests, with 2,000,000 tons; Carnegie Coal, 1,350,000 tons; Verner Coal & Coke, 345,000 tons; Burgettstown Coal, 255,000; Henderson Coal, 325,000; Chartiers Creek Coal, 270,000; McClane Mining, 475,000; Meadowlands Coal, 500,000; Pittsburgh & Eastern Coal, 240,000; Pittsburgh & Erie Coal Company, 430,000 tons, and western Pennsylvania mines of Youghiogheny & Ohio Coal, 1,120,000 tons. A number of smaller operators are identified with the new project and will add approximately 1,500,000 tons.

Mahaffey Coal Mining Co., Patton, $40,000 capital, has been incorporated. F. H. Maurer, Patton, is treasurer. The purpose of the company is to mine and ship coal and the incorporators are: L. W. Maurer and Alex. Keys, Mahaffey.

UTAH

Professor Schneider of the University of Utah School of Mines and four students are searching for coal in the East Mountains near Mount Pleasant. The professor is employed by a number of men who believe coal in paying quantities may be found there.

VIRGINIA

The N. & W. Ry. has commenced he electrification of its coal pier No. 3, doubling the dumping capacity and bringing the total capacity of the three piers to approximately 1,800,000 tons per month. These plans followed the announcement of the C. & O. Ry. of plans to build a new steel coal pier at Newport News. A meeting of the board of directors of that road is to be held late in September, when it is expected the plans for this improvement will be put into shape. Plans of the Virginian Railway to erect another $3,000,000 pier at Sewall's Point are going forward, and officials say they will likely be on the market within the next two months.

WEST VIRGINIA

The Brady Coal Corporation will hereafter be known as the **Brady-Warner Coal Corporation,** the first-named company having been reorganized, with the Warner interests identified with **W. H. Warner & Co.** now interested in this large concern and being represented on the board of directors. In connection with the reorganization, a bond issue of $1,000,000 has been floated with Otis & Co. of New York and Cleveland, for the purpose of acquiring additional property and making extensive improvements to the property. Approximately 10,000 acres of coal land in Clay County are to be acquired and developed. In the future the total output of the corporation will be handled by W. H. Warner & Co., through the main office at Cleveland and numerous branch offices. On the board of directors of the reorganized corporation are: Samuel D. Brady, A. P. Brady, S. D. Brady, Jr., and J. Z. Brady, all of Fairmont; W. H. Warner, Whitney Warner and W. L. Warner, all of Cleveland; Z. T. Kalbaugh, of Piedmont; David C. Reay of Morgantown. New officers are: S. D. Brady, president; Whitney Warner, Cleveland, vice-president; S. D. Brady, Jr., secretary; A. P. Brady, treasurer.

The Snake Island Coal Co., Rainelle, has been incorporated with $500,000 capital by J. H. Miles and associates, who have purchased coal land for mining development.

Loadings among the districts served by the C. & O. for the month of August, were not more than 30 per cent of normal, and in the Logan region there was a production of not more than 20 per cent owing to the acute car shortage and general transportation disabilities. The whole region was so congested with cars throughout the month that it was difficult to find a place for the empties, side-tracks being full of loads awaiting movement. The belief is expressed by E. L. Bock, general superintendent of the C. & O., that there will be a marked improvement in conditions before long.

Mineral County coal lands are to be developed by the **Brennan Coal Co.,** the headquarters of which will be at Hubbard. The scale on which this company will operate is indicated by the fact that it is capitalized at $100,000. Associated with P. J. Brennan, an experienced mining man, are W. E. Ambrose, P. J. Ross, M. A. Brennan and William Fiscus.

The Weirton Steel Co. announces the letting of a contract to the **Koppers Constructing Co.** for the erection of a complete coke and byproduct plant at the mills in Weirton. The plant will be of the latest design, consisting of a battery of about forty ovens. The contract calls for completion in eight months, and will give employment to several hundred workmen.

Approximately $100,000 was paid by W. D. Reed, of Fairmont, and W. T. Hughes, of Morgantown, for a tract of 173 acres of undeveloped coal land in the Sewickley measure, in Monongalia County, the sale being made by the **Francois Coal Co.,** in which Clarksburg people are interested. The purchasers represented the **Fort Grant Coal Co.** The tract sold is on Indian Creek near Lowesville.

The Farley Coal Co., Burch, has been organized, capital $3,000,000. Incorporators are W. A. Wilson, Alex Bishop, A. C. Pinson, Williamson, and H. H. Morris, C. M. Roehrig, Huntington, and three others.

Howard and Edward Cross of Cumberland, Maryland, and their associates have formed the **Wabash Big Vein Coal Co.,** for the purpose of producing coal in the Mineral County field, Emoryville to be the seat of operations of this company, which has a capital stock of $50,000. Others interested in the new company are: James E. Cross, of Keyser, and John J. and T. Frank Sheehan, of Baltimore Md.

Authority has been granted to the **Marmet-Oliver Coal Co.** to increase its capital stock from $50,000 to $250,000. O. J. Cox of Charleston, is the president of the company.

BRITISH COLUMBIA

J. M. Savage, manager of the Canadian Collieries (D) Ltd., is authority for the statement that there will be no shortage of coal in British Columbia this winter. He says that the only effect of the strikes has been to promote activity in the coal fields of Vancouver Island and other parts of the province. The strike, however, has had one result in the Northwest which is being felt by coal operators. Fuel oil is being used to a larger extent than in the past.

George S. Rice, of the United States Bureau of Mines, is visiting British Columbia and has been in conference with the **Hon. William Sloan,** minister of mines, with reference to various matters affecting the operation of coal mines on Vancouver Island.

ONTARIO

E. J. Ryan, who a short time ago retired from the vice-presidency of the F. A. Fish Coal Co., Toronto and Pittsburg, has joined the sales staff of B. J. Johnston & Co., wholesales coal dealers, Toronto.

Andrew A. Miller, president of the Western Dominion Collieries, Ltd., was in Toronto recently on his way to Saskatchewan after visiting the Pennsylvania coal fields. He stated that this year Saskatchewan production would be boosted by 1,000,000 tons which will release a large amount of coal for eastern Canada.

Hon. Harry Mills, Minister of Mines, has just returned to Toronto after visiting the government peat bogs at **Alfred.** He states that the entire output of the bogs has been snapped up by coal dealers as a substitute for coal.

Recent Patents

Track-Cleaning Machine for Mines. John G. Bradley, Topeka, Kans., and Wm. F. Metz, Buckner, Ill., 1,406,527. Feb. 14, 1922. Filed June 18, 1920; serial No. 389,999.

Coal-Mining Apparatus. Nils D. Levin, Columbus, Ohio, assignor to The Jeffrey Mfg. Co., Columbus, Ohio, 1,406,660. Feb. 14, 1922. Filed April 27, 1918; serial No. 231,182. Renewed May 10, 1921; serial No. 468,306.

Electric Mining Apparatus. Harvey C. Berkey, Claremont, N. H., assignor to Sullivan Machinery Co., 1,407,119. Feb. 21, 1922. Filed June 18, 1921; serial No. 478,506.

Mining Apparatus. Charles W. Wyman, Claremont, N. H., assignor to Sullivan Machinery Co., 1,407,120. Feb. 21, 1922. Filed June 18, 1921; serial No. 478,511.

Traffic News

Notice for a reopening of the coal rate case in Ohio, as decided by the Ohio Utilities Commission Aug. 22, was received by the **Southern Ohio Coal Exchange** and others. The notice came from the I. C. C. and purported to set the hearing Sept. 20 at Columbus. At the time of the awarding of the decision by the Ohio commission it was ordered that all Ohio rates should go back to Aug. 25, 1920, and instead of advancing the 40 per cent increase allowed at that time, they would be raised 26 per cent. The railroads sought to disturb the differential over which many rate cases have been fought. The nature of the rehearing on the case was not announced.

Announcement has been made of actual placing of contracts by the L. & N. for 50 new locomotives—40 to be made by the American Locomotive Co., and 10 by the Baldwin Locomotive Co. This is the largest power order ever placed by the road, which has been building most of its engines in its Louisville shops. The Girard Trust Co., Philadelphia, has arranged to supply $9,000,000 to the B. & O., for new equipment, which will include 35 Mikado type locomotives; 1,000 70-ton steel "gons"; 1,000 50-ton steel hoppers and other equipment. The road has fifteen years in which to pay off the mortgage loan.

The Louisville & Nashville R.R., late in August offered a standing reward of $5,000 for every person convicted of willfully tampering with equipment, the reward covering damage to bridges, roadbed, tunnels, equipment, etc. It is alleged that many coal and other cars are on sidings due to air and steam lines being cut, and due to grit being placed in the bearing journals and the like. A reward of $1,000 is offered for information concerning cutting of any hose lines.

Association Activities

Northern West Virginia Coal Operators' Association

The car shortage in northern West Virginia had reached such proportions early in September and was interfering so materially with the loading of coal at that time that a meeting of the transportation committee of the Association was held at Clarksburg to devise ways and means to meet the shortage and find a remedy. It has been suggested that the Pennsylvania, the Pittsburgh & Lake Erie and the Western Maryland be asked to send their empties into the Fairmont region over the B. & O. and that the coal after being loaded be turned over to the roads furnishing the empties. A sub-committee was appointed to hold a conference in Baltimore with Vice-President C. W. Galloway of the B. & O.

Obituary

O. A. Blackburn, aged sixty, president of the Pittsburgh Coal Producers' Association, and one of the best known bituminous coal operators in the country, died recently at his Pittsburgh home after a short illness.

Word has been received in Toronto of the death in Chicago of **Charles Wells,** manager of the Chicago Charcoal Co., and formerly manager of the Charcoal Supply Co., of Hamilton, Ont. Deceased, who was 40 years of age was widely known in the Ontario coal trade. The remains were brought to his home in King, Ont., for burial.

Coming Meetings

Kentucky Mining Institute will hold its annual meeting Nov. 3 and 4 at Seeback Hotel, Louisville, Ky. Secretary, Elizabeth C. Rogers, Lexington, Ky.

The National Industrial Traffic League will hold its annual meeting Nov. 15 and 16 at the Hotel Commodore, New York City. Secretary, J. H. Beek, Chicago, Ill.

Coal Mining Institute of America will meet Dec. 13, 14 and 15 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., 911 Chamber of Commerce Bldg., Pittsburgh, Pa.

Alabama Mining Institute will hold its next meeting Oct. 3 at Birmingham, Ala. Secretary, J. L. Davidson, Birmingham, Ala.

Coal and Industrial Exposition under the auspices of the Huntington Chamber of Commerce will be held Sept. 18-23 in the Chamber of Commerce Bldg., Huntington, W. Va.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting in connection with the Coal and Industrial Exposition at the City Hall, Huntington, W. Va., Sept. 19-22. Secretary, H. Smith, 212 Robson Pritchard Bldg., Huntington, W. Va.

National Exposition of Chemical Industries is holding its eighth national exposition at the Grand Central Palace, New York City, Sept. 11-16. Manager, Charles F. Roth, Grand Central Palace, New York City.

American Mining Congress. Twenty-fifth annual convention and exposition of mines and mine equipment will be held at Public Hall, Cleveland, Ohio, Oct. 9-14. Executive offices, the Hollenden Hotel; E. C. Porter, convention manager.

National Exposition of Power and Mechanical Engineering will be held at the Grand Central Palace, New York City, Dec. 7-13. Manager, Charles F. Roth, Grand Central Palace, New York City.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting during the week of Sept. 25 at San Francisco, Cal. It is proposed to arrange for a party to leave New York on Sept. 10, stopping at different cities en route. Secretary, F. F. Sharpless, Engineering Societies Building, New York City.

American Gas Association will hold its annual meeting Oct. 23-28 at Atlantic City, N. J. Secretary-Manager Oscar H. Fogg, 130 East 15th Street, New York City.